The York-shire Spaw,

OR A

TREATISE

Of foure Famous medicinal Wells, *viz.* the Spaw, or Vitrioline-Well, the stinking, or Sulphur-Well; the Dropping, or Petrifying-Well; and S. *Magnus*-Well, near *Knaresborow* in YORK-SHIRE.

TOGETHER

With the causes, vertues, and use thereof.

For farther Information read the Contents.

Composed by *J. French*, Dr. of Physick.

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BIBLIOTHECA BODLEIANA

Celeberrimo viro, THEODORO de MAYERNE, Equiti Aurato, triumque Monarcharum Archiatro

ὑγιαίειν.

CUi niſi Medicorum Monarchæ, Monarcharumque medico dicare liceat opellam hanc de eo elemento elucubratam, quod Germanum Jovis, ac Nepotem Saturni ingenioſa finxit antiquitas, cunabula rerum depicturа? Hanc dextrâ omnibus porrectam ſi tua paſſim celebrata claritas ſereniore fronte decorari dignetur, nubilo-

ſa Momorum ſupercilia non eſt quod vereor. Tenera quidem proles eſt, ſed ſi coruſcantes Phœbei tui luminis radios irretortè contueri polleat, non dubitandum eſt, quin genuina agnoſcetur, nec ut adulterina a Medicinæ Myſtis abdicabitur, nec a me illius ſuſceptore abnegabitur, repudiabiturve. Et quid tibi Philoſophorum Cynoſuræ juſtius deferri poterit, cum Univerſi penè Philoſophorum, ſive flores, ſive fæces, hoc argumentum meum extitiſſe primam materiam, ex qua exoriuntur Univerſa, nec contradicente plebeculâ, & imbiberunt, & tradiderunt? Quid enim creatum complectitur natura rerum non ex aqua humectante, & coaleſcente

adultum, & animatum? Ignem quid humoris expers pabulatur? Aërem verò nuncupari attenuatam aquam quilibet cerdo se explorâsse gloriatur. Terram quoque exuccam in pulverem redigi, & fatiscere omnis tressis agaso deblaterat. Quid spirat, vernat, crescit, consistit sine suo fluore? Animalia, plantas, lapides, metalla iestur. Sed hæc prolixius tuæ eruditioni multifariæ philosophari, perinde est ac noctuas ad Athenas deferre, & Crambem bis coctam apponere, vel capulam undæ in Oceanum (θάλασσα velut viror ab effectu dictum) instillare satagere, quibus minutiis supersedere consultius autumo.

Digneris itaque in hisce noſtris ſcaturiginibus, dulcibus, ſalſis, & mediocribus, in Oceanum, veluti tuæ cenſuræ influentibus, Candoris tui tridentem intingere, ut, te jubente, effluant puriores, hydropotiſque gratisſimæ. Hoc mihi votum ſi dederis conceſſum, ad majora ibo alacrior, quæ tuæ tutelæ (ſi cui) commendare geſtiam, & interim ipſe audire

Tuæ Amplitudini

Londini *Maii* 21°. *devotisſimus*

1652°. JOH. FRENCH.

To

To the Reader.

Reader,

I Being the laſt year commanded by my occaſions down to the Spaw in *Yorkſhire*, was deſirous to improve my time in applying my ſelf to experiment, & obſervation: to the one for the diſcovery of the true cauſes of thoſe Famous Medicinal waters of *Knareſ-borow*: to the other, to be convinced what real effects they wrought upon the drinkers thereof. And this I had leaſure, beyond expectation, to do, being prevented from my intended, and ſpeedier return, by reaſon of the then Northen diſtractions. Now my experience herein I do freely and faithfully preſent to the world a publick account of; as for a more full ſatisfaction of thoſe of mine own profeſſion, (eſpecially ſome worthy Dr^s^. in the South, who firſt excited me hereto;) ſo alſo for the better direction, and greater ſucceſs of thoſe that ſhall make uſe of thoſe waters.

In my obſervation I perceived that theſe waters, although very effectual in themſelves, yet many times proved the contrarie, and that by reaſon, firſt of a want of a due

due preparation; ſecondly of intemperance in dyet; thirdly of a prejudice againſt the uſe of all manner of Phyſick in the taking thereof, which ſhould promote the full operation of them, and prevent the ſymptomes, which are oftentimes occaſioned by them; fourthly by reaſon of miſtaking the proper water; & laſtly by not obſerving a juſt proportion ſuitable to the conſtitutions & maladies. Now for the prevention of whatſoever ſhall occaſion the ineffectual operation of thoſe waters I have publiſhed theſe few lines, which are made up, not of obſcure, dark, and ſuch as the vulgar might not underſtand, but of words plain, and as clear as the glaſſes themſelves wherein the waters are drunk, that every one may ſee what it is he drinks, clearly ſeeing therein the true cauſes, vertues, and uſe of them.

I do not deſire that any ſhould adhere to my judgement herein any further, than they ſee it conſonant to reaſon; for to that, as alſo to the candid cenſure of the learned Dr^s. of *York-ſhire*, long experienced in theſe waters, and to all other, who ſhall rationally, and civilly convince me wherein I have erred, I ſubject it. Reader, approve of me according as herein thou findeſt me

Thy friend

J. F.

Chap. I.

The place together with the Nature of the ſame, where four famous Medicinall Springs are diſcovered, in York-Shire.

ABout fourteen Miles from *York*, Southweſt, is ſituated the ancient Towne of *Knareſborough*, formerly famous for the invincible Caſtle thereof built upon a Craggy Rocke, but now remarkable for four famous Medicinall Springs, which in theſe latter yeers have been diſcovered near the ſame; the names of which are *viz.* The *dropping* or *petrifying Well*, the *ſulphur*, or *ſtinking Well*, the *Spaw*, and *St. Mugnus Well*. In naming onely four, I ſpeak as to the ſpecies, or kinds of them, but Doctor *Deane* in his treatiſe of the ſaid Waters mentions five, which in effect are but three, for he ſpeaks as to the Individuals, and names three ſulphur Wells, which indeed differ not at all, the one from the other, and if at all, yet onely gradually; and withall he rejects *St. Mugnus* as an ineffectuall ſuperſtitious relique of Popery, which notwithſtanding, becauſe it hath of late regained its reputation (as I ſhall

afterwards declare) which it had loſt in the account of ſome, I thinke worthy of a place amongſt the four famous Wells of *Knareſborow*.

The Nature of that country, eſpecially South-weſt, is very rocky, yet mooriſh, & heathy, conſiſting of an unctuous bituminous earth, which the country People cut at a certaine time of the year, making Turfe, and Peate thereof, which being dryed make good fewell. In that place are found ſeveral ſorts of Earth, Stones, Minerals, and veins of Metals. Doctor *Dean* obſerved white, and yellow Marle, Plaiſter, Oker, Rud, Rubrick, Free-ſtone, hard greet-Stone, (which broken in the middle doth oftentimes very much reſemble Loaf-Sugar,) a ſoft Reddiſh-Stone, Yron-Stone, Brimſtone, Vitrial, Nitre, Allume, Lead, Copper, and divers mixtures of theſe; to which I ſhall add Alabaſter, and a glittering ſand, which yields ſome Gold: And certainly many more than theſe might be diſcovered, if the experienced Artiſt would make a diligent ſearch.

Chap. II.

Of the original of Springs in general.

BEfore I ſpeak any thing of the Nature of Springs, or Fountaines in particular, it will

will be neceſſary, as conducing to the better underſtanding of them, to premiſe ſomething concerning the original of them in general; and the rather, becauſe there have been great controverſies betwixt the Stoicks and Peripateticks about the cauſes of them. Now the ſeveral opinions concerning the original of laſting Springs, (which are called *Fontes perennes*) may be reduced to three heads; for either they proceed from rain-water, or they are generated in the bowels of the earth, or elſe they muſt of neceſſity flow from the Sea through ſubterraneal channels. If any ſhall object as ſome have done, and ſay they may come from ſubterraneal lakes, let me demand of them whether thoſe lakes proceed not from ſome of the three former, and whether they would not in time be exhauſted if otherwiſe.

Arguments for the firſt opinion alleadged and anſwered.

Arg. They that contend for the firſt opinion, ſuch as are *Albertus Magnus*, *Georgius Agricola*, *&c.* Affirme, that in thoſe Countreys where there falls but little rain, the Springs are few and ſmall, and that in winter time all Springs flow more plentifully, than in ſummer, and that by reaſon of the wetnes of the Seaſon: and what becomes ſay they of all the rain, if it ſinks not into the earth, and there maintains Springs?

Sol 1. The Aſſertion concerning the increa-

fing of Springs in winter is not universally true; for *St. Magnus Well* in York-shire (as I was most credibly informed by the Woman that hath looked to it, and been the keeper of it for these many years last past) begins to rise high about May, and to fall low about October; besides divers more Springs which in several counties of this Nation are dryed up all the Winter, and flow anew towards the Summer. And *Pliny* makes mention of a certain Spring in *Cydnus* before *Tarsus*, that flows onely at the Spring: many more of this nature might be produced if there were occasion.

2. If that were granted to be true which they say, yet it doth not follow that rain is the material cause of Springs although at that time they break forth, which were before dryed up; for their drying up was not occasioned for want of rain to supply them, but by reason of the dryness of the earth towards its superficies which attracts to it self, and drinks in for the satisfaction of its drought the water of the Springs, which it doth again let go, when it hath drunk plentifully of the showers from Heaven. Now that the dry earth will drink a great quantity of water, you may see by the drying up of Rivers in a long drought by the dryness of the earth, although the Fountains, which are the heads of those Rivers, flow plentifully at the same time as some do, although others some be dryed up. And as for those Springs

which

which break forth onely after great rain, they are caused from the rain which is drunk up by some boggie, spongious earth, and is drained from thence, or which is sunk into some caverne, or hollow place, near the superficies of the earth through some secret passage thither, and there being collected in some considerable quantity imitates a Spring as long as it lasts.

3. The greatest part of showers of rain falling upon high places run down from thence into plains, and from plains through small channels or trenchs into Rivers, and that rain, which falls upon any place from whence it cannot in some such manner be conveyed away remains upon the superficies of the earth, till it be exhaled by the Sun, as we see in divers places: besides it cannot be imagined that rain sinks so far into the earth as to supply Springs; and that because it is generally observed by all that dig in the earth, that rain wetts not the earth above ten feet deep: And the reason hereof *Seneca* the *Philosopher* gives in his third Book *Naturalium quæstionum* chap. 7. Where he saith, that when the earth is satiated with showers, it then receives in no more, and this we see by dayly experience. Besides, when wee dig a Well, although it be in a soft place, wee dig sometimes one, two or three hundred feet deep, before wee come at quick Springs, and that the rain should sink so deep, it is no way probable; nay, although there were hallow veins and chinks

in the earth, through which many would have it passe to a great depth; for who cannot easily conceive that those veins and crannies (which yet are not granted to be in every place where there are Springs) are easily stopt with dust, or dirt, which the rain carryes with it when it is fallen on the earth; or swelled up, and contracted, as we see they are in Summer time with rain after a long drougth?

Arguments for the second opinion Alleadged and answered.

Arg. They that contend for the second opinion, such as *Seneca &c.* affirme that Springs are generated cheifly of earth changed into water, and that because all Elements are mutually transmutable into one the other. And some, as *Aristotle*, and *H. ab Heers*, that Springs are generated of the aire shut up in the earth and by the coldnes thereof condensed into water.

Sol 1. It is more probable according to reason and experience, that by reason of the density of the earth water should more easily be converted into earth, than the earth into water.

2. It is to be wondred at, that seeing that ten parts of air (if not many more) serve for the making of one part of water conteinable in the same space, there should be so much space in the earth for the containing of so much air as serves for the making of such a quantity of water, as springs dayly out of the

the earth: Besides so much air being spent, there would of necessity follow a *vacuum*, for where should there be so many, and great crannies, or holes to let the air into the earth fast enough? But if there were, yet how is it possible that so much air can be corrupted in such a moment, the whole Elementary air being, of its owne nature most subtile, and not being sufficient to make such abundance of water as all the Springs of the earth will amount to? Now although this answer be according to the sence of common *Philosophers*, and sufficient for the satisfaction of this objection, yet *Helmont* will not admit of any such suppositon, *viz.* That air and water can at all be mutually transmuted into one the other. It is true, saith he, that water can easily be turned into a vapour, and the said vapour into water again; but this vapour is nothing els materially, and formally but a *congeries* of atomes of water sublimed, & air will not in cold or heat yeild water any more then it contains in it the vapour, *viz.* of rarefied water. For saith he, if those two Elements were so mutually convertible, one species must be transmuted into another, and the air that is made out of water, may be again reduced into the same numerical water which it was before its rarefaction: but this cannot be, unless you will grant that which all *Philosophers* deny, *viz.* That *A privatione ad habitum datur regressus*: Lastly for the confirmation of his opinion, he brings in an experiment:

periment: *viz.* Air shut up in an Iron pipe of an ell long may be compressed by force, that it will be contained within the space of five fingers, which, when it expands it selfe, drives out the pellet (with which it was stopt at the one end) with a sound like to that of a gun, which would not be, if the air thus compressed could have been turned into water by the coldnes of the Iron.

Arguments confirming the third opinion, and objections made against it, answered.

The third opinion is the most ancient of all, and was held by *Plato*, and *Thales* himselfe one of the first *Philosophers* in *Greece*, and not so only, but is also asserted in sacred writ, *viz.* *Ecclesiastes* chap. 1. vers. 7. Where the wisest of men affirmes, *that all the Rivers run into the Sea, and yet the Sea is not full, unto the place from whence the Rivers come, thither they return again.*

The reason for the confirmation of this opinion are many, but the chiefest are these two: First, because there is not any body besides the vast Ocean, that can afford neer such an abundance of waters as spring from the earth. Secondly, because the Sea it selfe is not increased by that multitude of waters that flow dayly into it, as it must of necessity be, unless they did by occult cavities of the earth return to their Fountaines, as is declared in the fore cited place by the wisest of Philosophers.

ſophers. Neither is *Ariſtotle's* imputing the waſting of the Sea to the Sun and winds, of any force to perſwade to the contrary; for although this kind of waſting may be granted in part, yet if it ſhould be according to his judgement, his whole Element of water had bene long ſince conſumed.

Obj. Seeing the Sea according to its ſituation is lower than ſprings (for the courſe of water is downward) how then doth the water thereof aſcend ſo high as the heads of ſprings, eſpecially thoſe in high Mountains, and Hills?

Sol. I ſhall firſt ſhew after what manner it doth not aſcend, according to the opinion of ſome, for there are divers opinions concerning the cauſes of its aſcent.

1. It is not forced upward by a ſpirit, or breath that is in the water it ſelfe, as *Pliny*, and *Valleſius* ſuppoſed. For if it ſhould be granted that there were any ſuch intrinſecal impulſive ſpirit, or breath in waters, as it can not rationally be (for it is not obſerved that the Sea is moved any other way but by tempeſts ſometimes, and the Moon by way of tide) yet that could not (though aſſiſted extrinſecally by ſtrong winds blowing contrarily, and that in an open Sea,) force them to the height of ſprings, much leſſe could it alone in ſubterraneal crooked channels.

2. Neither doth the weight of the earth force it up, as was the opinion of *Bodinus*, and *Thales*: For the earth, ſeeing it is a ſolid,

and firme body, doth not lye upon, and presse the water, but contrarily, the water the earth: Neither is the earth held up by the water, but the water by the earth, as you may see in all Rivers, Lakes, Pits, and the water of the Sea it selfe, when it is in channels of the earth. For if they should not at any time be quite full, as it sometimes happens, the upper part alone proves empty, which would not be if the waters were pressed by the earth, but contrarily.

3. Neither doth the weight of the Sea force it self up as was the opinion of *Seneca*, who supposed that the greatest part of the water of the Sea is out of its place, *viz.* above its place in the place of the air, and so above the heads of springs, towards which it forceth it selfe by its natural descent, and so riseth up again as high as the level of the water from whence it came; but he proves it not, onely he asserts it.

But Doctor *Jorden* in his *treatise* of *Baths* being of the same opinion as touching the Seas being higher than the earth (though he holds that the natural place of the waters is above the earth) seemes to give some plausible account of it: For saith he, although neer the coasts it be depressed, and lower than the shoare, yet there is reason for that, because it is terminated by the dry, and solid body of the earth, as wee see in a cup or bowle of water filled to the top wee may put in a great bulk of silver in pieces, and yet the water will

not

not run over, but be heightened above the brims of the bowl, the like, ſaith he, we may ſee in a drop of water put upon a table, where the edges, or extremities of the water being terminated by the dry ſubſtance of the table are depreſſed, and lower than the midle like a halfe globe: But take away the termination by moiſtening the table, and the drop ſinks even to an evennes. And whereas we ſee, ſaith he, that Rivers run downward toward the Sea *per declive*, it doth not prove the Sea to be lower than the Land, but onely neer the ſhoar where it is thus terminated, and in lieu of this it hath ſcope enough aſſigned it to fill up the Globe, and ſo to be as high as the Land, if not higher. Now if I ſhould graunt that the Sea were higher in the midle than the higheſt place of the Land, yet it is very improbable that it ſhould force it ſelfe to the tops of Mountains ſooner than into Rivers which are far lower than the head of Springs, and more open than the narrow channels, and veines of the earth, through which it muſt paſſe to the Springs. And for that ſimilitude of his concerning the termination of water by drynes, it will not hold water, nay it rather makes againſt him, than for him, for he ſaith that this termination is taken away by moiſture, Now let me demand of him, or of thoſe of his judgment, whether or no many great Rivers terminated in the Sea be not a ſufficient moiſture for the taking away of the termination of the

water made by the dryneſs of earth, and ſo to make the globous Sea to ſink to an evennes?

4. And as the water is not elevated by any of the three foregoing wayes of impulſe, or forcing, ſo neither is it by any of theſe two wayes of attraction, *viz.* by the power of the Planets, or by the earths ſucking it in, as a ſponge doth water, from beneath, and ſending it to higher places; For the firſt, there can be no ſuch attractive vertue demonſtrated; and if there were, it would as well, and promiſcouſly extend a like to Valleyes, and low Countreyes where wee ſee few Fountains, as well as to high Mountains, and Hills, from whence proceed the greateſt Springs. As to the ſecond, an attractive vertue, if there were any ſuch here, attracts to this end, that the ſubject wherein it is, might conſume, retain, or enjoy what is attracted, and over and above that, none, or at leaſt not ſo much as would ſuffice for the making of Springs.

5. Neither are there ſuch veins, in the earth through which the water ſhould paſſe, as doth wine through crooked pipes or cranes which wine-coopers, and Vintners uſe for the drawing of wine out of one veſſel into an other, through which the wine being once ſucked, runs continually till all be run forth: For the veines in the bowels of the earth are not wholly, and throughout full, as of neceſſity they muſt be before water will aſcend through them for pre-

preſervation of its continuity and the avoyding of a *vacuum*.

6. Neither is the water raiſed to the ſuperficies of the earth by *Helmonts ſabulum*, or virgin-earth, which he ſaith is a certain ſand continued from the Center of the earth in divers places, even to the ſuperficies of the ſame, and to the tops of ſome Mountains, which ſand hath in it a vitality, and in which as in a vital abode, and natural place, the water, whileſt it remains, is living, and enjoyes common life, and knows neither ſuperiority, or inferiority of place, any otherwiſe than the bloud in the veines which flowes upward to the head, and downward to the feet: But moreover he adds, that when this water is let out of its natural abode, *viz*, the virgin earth, as bloud out of a veine, it then doth like a heavy thing haſten to its Center, or iliad, *viz*. the Sea. Now for the confirming of this vitality in water, he brings in this diſtich of the Poët

——————————— *undas*
Spiritus intus alit, vaſti quoque marmoris æquor;
Mens agitat molem totam diffuſa per artus.

And he further adds that the ſea hath in it a kind of life, becauſe though the winds ceaſe, yet it hath its ſpontaneous motions, and obſerves its tides according to certain obſervations that it hath of the courſe of the moon, as if it would riſe to meet her. Now

let us obſerve the weight of *Helmonts* arguments; and that indeed is little or none as I conceive, for firſt he doth not any way demonſtrate that continuation of his virgin-earth from the Center to the ſuperficies of the earth, much leſs the vitality thereof: Secondly for the vitality of water he onely quotes a poeticall fiction: and thirdly for the ſpontaneous flowing of the ſea, it is noe more a demonſtrative reaſon for the vitality thereof, than the loadſtones attracting Iron a reaſon of the vitality of the ſame.

7 Neither is it raiſ'd upon that account of condenſation, & rarefaction, which the learned Doctor *Flud*, endeavours to demonſtrate by the experiment of his weather-glaſs. The air, & water, ſaith he, fill up all the cavities of the world, ſo that in what hemiſpheare the air, by reaſon of cold is condenſed, there the waters are rarefied, and ſwell, as may be ſeen in the weather-glaſs, where the water is rarified, and raiſed higheſt, when the air is with cold moſt condenſed; as alſo in the ſwelling of ſprings in froſty-weather. Now although this his experiment of the aforeſaid glaſs doth prettily illuſtrate the buſines of condenſation, and rarefaction in cloſe veſſels, yet it doth not demonſtrate ſufficiently the raiſing of waters from the deep ſubterraneall channells to the ſuperficies of the earth, for it is apparent, as I have ſhewed in the former part of this chapter, that ſome ſprings ſwell more in ſummer than in winter; Secondly

condly if ſprings do riſe higher in time of froſt than in hot ſeaſons, it is onely either becauſe ſome ſubterraneall vapours, which could not evaporate by reaſon of the earth being conſtringed with cold, are condenſed into water, and ſo make for the preſent ſome ſmall addition to ſprings, or becauſe the ſubterraneall waters are rarified, and ſwell by that heat which is occaſioned through the aforeſaid binding of the earth, for we ſee by experience that ſprings are hotter in froſty weather than in ſummer. And thirdly becauſe the water of that weather-glaſs if it were open at the top as the veins of fountains are, would not obſerve the nature of the ſeaſon ſo, as to riſe or fall accordingly, for that in a cloſe glaſs it ariſeth onely *ad evitandum vacuum*; and now rather than nature ſhould ſuffer a *vacuum* by the airs being condenſed, vapours and fumes would proceed out of the earth, nay the next adjacent warm air would come in as a ſupply to prevent a *vacuum*, ſooner than water in the bowels of the earth could be rarified, which would not in an open glaſs be raiſed at all, though the weather were never ſo cold.

By theſe ſeven negatives it appears how the waters in the earth do not aſcend, I ſhall endeavour to demonſtrate how they do aſcend to the heads of Springs.

It is abſurd to think (being the ſame which *Ariſtotle* himſelf and his followers graunt) that

that the waters ſhould not be elevated from the bottom of Caverns, to the heads of Springs after the ſame manner as water is elevated from the Sea to the midle region of the air. Now this elevation is done by the force of heat reſolving the water into vapours. And if ſo, why then may not the other be done after the ſame manner, *viz*: by heat: Neither is it any matter whether that heat be above, or beneath the waters, if ſo be it forceth them into vapours, and maketh them aſcend as high as is requiſite they ſhould. But it may be ſaid that the middle region of the air is very cold, and it is coldneſs that condenſeth vapours into water: but now the earth, through which theſe vapours paſs, is warm, as is agreed by moſt. To this I anſwer, that it is not neceſſary that there muſt be cold for the condenſing of vapours into water, it is ſufficient if there be a more remiſs degree of heat, as you may ſee in the head of an alembick, and the cover of a ſeething pot, the interior ſuperficies thereof being full of drops, whileſt they themſelves are warm.

Now for the making of a vapour of any liquid matter, heat is altogether, and abſolutely neceſſary, according to the opinion of all, and for much vapour there is much heat, and a conſiderable proportion of humour required. But ſeeing abundance of water comes from the Sea into the bowels of the earth, the ſubterraneall heat, which muſt be

in

in like proportion, being the chiefeſt cauſe of the generations of Springs, is next, and diligently to be inquired into. Now that the earth is hot, it is known by daylie experience. And *Lucilius Baldus* ſaith, that the earth being newly digged is hot, & ſmoketh, and that out of deep wells is drawn warm water, and eſpecially in winter ſeaſon by reaſon of the cold binding the earth, and keeping in the heat: but how this heat comes to be in the earth, he ſpeaks like a Stoick, and ſaith it is in it as naturally, as vitall heat is in animals. But this opinion is not ſo probable as that of the Peripateticks, who ſay that the earth is of it ſelf, and naturally cold, becauſe denſe and heavy, but hot accidentally onely.

Now the great queſtion will be from whence this heat of the earth doth proceed.

I will firſt ſhew from whence it doth not proceed, and thereby confute the opinion of ſome.

1. It proceeds not from the Sun, as many imagine, ſuppoſing that all heat in the world comes from thence, and that the earth being beat upon by the ſun-beames, doth thereby receive into it ſelf a certain heating vertue. But this is very improbable, ſeeing that they, that digg in the bowells of the earth, obſerve that the heating power of the Sun, although in moſt hot ſeaſons doth not penetrate the ſuperficies of the earth above ſix feet deep: do not we ſee how a thin wall, or boughs of trees in an arbour keep off the heat of the ſun, though

never so great? to say nothing of the earths being colder two feet deep in Summer than in Winter.

2. It proceeds not from an antiperistasis of the cold air in the superficies of the earth, for this hath place no further than the heating power of the rayes came. Besides the naturall cold of the solid, and dense earth must of necessity have greater power to repell upwards, than the adventious of the soft, thin, and light air to force downwards the heat of the sun, which, indeed in all reason should, being generated but a little way within the earth of its own accord being very light ascend upward through the passage made by the Sun: and this we know that after a long Summers-day, it is before the next morning almost vanished though never so great, much less will it be preserved till, and through the Winter. It must then of necessity be another kind of heat, & it is such, that towards the superficies of the earth is colder, as being more remote from its original, or beginning, and is in Summer-time by reason of the Suns opening the earth, and making vent easily, expired, and is therefore less perceived, but in Winters frost is restrained from exhaling, and is condensed, as may easily be perceived in deep wells.

Now to know from what principle this heat hath its original, or rise, we must examine whence proceeds the heat in hot baths, for there the subterraneal heat offers it self more

conſpicuous and apparent to our view.

But concerning the original of the heat of ſubterraneal waters, there is as much doubt, as of the generation of thoſe waters themſelves. And therefore I ſhall in the firſt place endeavour to prove how heat doth not come, thereby confuting the opnion of ſome, and in the next place to ſhew which way it may proceed probably.

1. It is not cauſed by the heat of the Sun, and that partly for the reaſons above mentioned, as alſo becauſe then, thoſe waters would be hotter in Summer-time, than in Winter.

2. It is not from the agitation of winds in the channels of the fountains, for if ſo, then they being vented forth, the heat would preſently be extinguiſhed.

3. It comes not from ſulphur, *Calx viva*, (as is the opinion of many learned, as *Seneca*. &c.) and that becauſe neither doth ſulphur at all heat unleſs it be actually hot, nor *Calx viva*, unleſs whileſt it is diſſolving in water: to ſay nothing of that vaſt quantity, which would in a little time be reſolved, and the ſudden remarkable change that would be in hot ſprings.

4. It proceeds not according to *Doctour Jordens* opinion, from the fermentation that is in the generation of metals, and minerals cauſed by the agent ſpirit acting upon the patient matter, and ſo producing an actuall heat (for *ex motu fit Calor* ſay all Philoſophers)

phers) which serves as an instrument to further this work of generation; For if it were so, then the heat in bathes would in time cease, for he himself saith that this fermenting heat continues no longer till the generation of them be finished, which is done in some determinate time, but we see that the hot baths continue for ever. Neither doth it suffice that he saith that generations of metalls are not terminated with one production, but the mineral seed gathereth strength by enlarging it self, and so it continually proceeds to subdue more matter under its government, so as where once a generation is begun it continues many ages, and seldom gives over, as we see in the Iron mines of *Illua*, the tin mines in *Cornwall*, the lead mines at *Mendip*, and the *Peak*, which do not onely stretch further in extent of ground, than hath been observed heretofore, but also are renewed in the same ground, which hath been formerly wrought, I say his saying thus doth not suffice, for though it be so as I do not deny but it may, yet notwithstanding he doth not say, that generation of metals continueth in one place, except any ground be digged first; and so space and place left for new matter to come, as is not in our baths, and so by consequence the flowing of hot water would cease in that place, where the said generation is not continued; and if that generation be extended further yet so also and accordingly is the heat diminished, unless

less it break forth continually in new places: but we see hot springs continue many years together in one place at a constant heat. Besides if this opinion were true, then where we see metals, and minerals generated, there also must of necessity be hot baths, but we see it is not so. I shall now moreover demand of him, how that crude metalline matter is before any the said fermentation sublimed from the central parts of the earth towards the superficies thereof, if not by a subterraneall fire?

All these being excluded, it remains now that we consider of a subterraneal fire onely, for it seems impossible that so great, and durable a heat should be caused, or preserved by any other power whatsoever, than that of fire, and of this opinion was *Empedocles* an ancient Greek Philosopher, and also *Seneca*, but both these differ amongst themselves as to the manner of the heats proceeding from this fire, and indeed from other Authours that seem to be more Anthentick. The one is of opinion that it is sufficient if the fire be under the place, through which the waters run, and so like fire under a still force up the water by way of a vapour: the other that the heat proceeds from some occult remote burning and passed through the veins, and fibres of the earth, where it meets with the waters, and distill them up to the heads of the fountains. But *Agricola* excepts against these two ways as being very improbable; the first, be-

cauſe the earth, where the fire is, could not endure the fire ſo long, being of a calcinable, & cumbuſtible nature: the ſecond, becauſe by this way ſuch a quantity of water could not be ſo heated as to be turned into a vapour ſo ſuddenly, by ſo ſmall a degree of heat.

There can therefore no other reaſon be given for theſe hot ſprings, than the fire which burns in the very cavities, and caverns of them, the cavities themſelves conſiſting of a Bituminous matter. For Bitumen, and theſe things which are made of it being kindled burn in water, by which alſo the ſaid fire is cheriſhed: This you may ſee in *Naphtha*, which is a kind of Bitumen, for if you put but a drop thereof into water, and put fire to it you will ſee it burn, and continue burning ſo long, that you would wonder at it, which could not be unleſs it were fed by the moiſture of the water, which it did attract, and tranſmutes into its own nature; The like you may ſee in Champhir, and other kind of Bitumen. *Pliny* alſo affirms that theſe are ſome certain burnings in the earth, which ſometimes caſt out Bitumen, and are increaſed by raine. And *Fallopius* ſaith that in the territories of *Mutina* is a ſhort plat of ground, out of which comes fire and ſmoke, and the ground is all like duſt, which if you kindle, you cannot quench again with water: ſo that theſe kind of fires are perpetual, and very long laſting in waters. And hath it not been obſerved that a fiery Bituminous matter doth

doth ſometimes flow out of hot Springs? *Pliny* makes mention that in the City *Somoſata* of *Comaganes* a certain lake ſent forth burning mud: and *Plato* makes mention of the like concerning a Spring in *Sicilia*: And *Agricola* reports another upon his credit. *Fallopius* alſo ſaith that in many places where the earth is digged deep, there are aſhes, and calcined ſtones, which are the effects of fire, and that in the territories of *Modena*, *Bolonia*, *Florence*, and other places, as in *Italy* &c, there are found Springs and ſeveral places caſting out fire. But as to Springs, this happens onely where the bituminous matter is very near the Spring head, and as high, and where the veins are more open.

Now then the manner of Springs being cauſed by this Bituminous fire is this, *viz*: Seeing art doth for the moſt part imitate nature, the thing is even the ſame in a hot Spring, as in a diſtilling veſſell, or a ſeething pot covered with a lid; onely there is this difference, that to the bottom of theſe the fire is put on the out ſide, but here the fire is within the cavern it ſelf through which the water paſſeth, and that either lying in the bottom, or ſticking to the ſides thereof. As therefore in theſe artificial veſſels the water being by the heat of fire reſolved into a vapour is forced upwards to the covers or heads thereof, where by reaſon of ſome leſs degree of heat it is condenſed into drops, and returns to its ſelf, and into its own nature

ture again: So even after the ſame manner water in the caverns of the earth being heated by the Bituminous fire, with which it is mixed, is by the heat thereof forced into a great quantity of vapours, which aſcending through the cranines, veins, and fibres of the earth being there for the greateſt part turned into water, doth with the reſt of the vapour yet very hot break forth in fountains *viz*: very hot, and very full of ſpirit, ſo that it ſeems to boyle, if the fountains be near to the caverns, or onely warm, if more remote. And as theſe Springs differ in their heat according to their nearneſs, or remoteneſs to their fire, ſo alſo in their Bituminous odour? and taſt. For as in diſtilled waters their *Empyreuma* vaniſheth in length of time, ſo in theſe in length of courſe: So that theſe fountains, which are very remote from this Bituminous fire, are neither, hot, nor have any Bituminous odour. And as by this natural diſtillation water is the beſt way procolated from its Sea ſaltneſs; ſo alſo doth it become thereby leſs obnoxious to putrefaction: For we know that diſtilled waters laſt longeſt.

Ob. It may be objected, that if the matter preſerving this fire were Bitumen, then it would follow, that almoſt the whole world ſhould be Bitumen, becauſe ever ſince, and before the memory of man theſe hot baths were, and are like to continue for ever, and therefore there muſt be that element for ever whichmuſt preſerve that fire.

Sol.

Sol. It doth not follow that there muſt at preſent be ſo much Bitumen as will maintain the fire ſo long, for it is perpetually generated, and as long as there ſhall be ſiccity, and humidity in the earth, there will be Bitumen generated: And do not we ſee that metals are generated a new in the ſame places, out of which they have formerly been digged? Witneſs the profit which *Fallopius* ſaith the Duke of Florence hath by it; and the teſtimony of learned *Sendivogius*, who ſaith that there have been metals found in mountains where formerly there have been none. If ſo, then much more may ſulphur and Bitumen be generated a new.

Ob. If it ſhould be granted that Bitumen is generated a new, yet, if that were the aliment of the fire, the fire would change its places, becauſe the Bitumen is conſumed one part after another, and ſo by conſequence the baths would not be ſo equally hot as before, the fire being by this means more remote from the fountains.

Sol. The flame is fed two ways, either when the flame follows the matter, as when the fire burns wood, or when the matter follows the flame, as in a lamp, in which the oyle follows the flame, not the flame the oyle; and ſo it is in the earth, and therefore the fire is always in one place. Neither doth that withſtand it, which we ſee by experience in ſulphur which is burnt part after part, the fire following of it: for you muſt know that

in the earth where there is a great heat, the Bitumen and Sulphur are melted, and by this means follow the flame, as I ſaid before of Oil.

Ob. If Bitumen feed the fire of theſe baths, then the waters thereof would have the odour, taſt, and colour of Bitumen; but it appears that they have not.

Sol. Though all baths are heated by Bitumen, yet ſome immediatly, as thoſe which do paſs through the place where it burns, & theſe onely have the taſt, and odour of the ſame: and ſome mediately, as thoſe that paſs through places, as rocks, &c. heated by Bitumen, burning under them, as was the opinion of *Empedocles* and *Vitruvius*. Neither do I by this diſtinction contradict what I ſaid before, concerning the waters being diſtilled up by that fire onely which burned in the caverns, and veins of the earth, through which they paſs: for in this place I ſpeak onely of the waters being heated, this mediate heat not being ſufficient to diſtill them to any conſiderable height.

Ob. It is very improbable that any ſubterraneal fire can burn within the bowels of the earth by reaſon of the want of air, as we ſee in cupping glaſſes, where as ſoon as they are applyed, the fire goeth out; beſides the fuliginous vapours would recoil and choak the fire, for there are few, or no vents and exhalation ſeen.

Sol. There is not any ſuch great want of air

air in the earth, nay there is ſuch a plenty of it there, that many learned Philoſophers were, nay, *Ariſtotle* himſelf of opinion, that all Springs were generated of ſubterraneal air.

2. Air is not the aliment of fire, for ſaith the *Lord Bacon* in his Treatiſe *De vita & morte*, *Flamma non eſt aer accenſus*, flame is not kindled air; nay, but unctuous vapours, which ariſe from the matter that is burnt, ſo that whereas without air fire goeth out, and is extinguiſhed, the reaſon is, becauſe the fuliginous vapours wanting evaporation, do recoil upon the fire, and choak it. Now this Bituminous fire is not, being of a ſulphureous nature, very fuliginous, and beſides what ſmoak or ſumes or vapours there come from it are ſubtile, and penetrating, and either evaporate through the ſuperficies of the earth inſenſibly, or incorporate themſelves with ſome ſutable ſubject that is in the earth, or els are of themſelves condenſed into ſome unctuous matter adhearing to the ſides of the caverns into which they are elevated. So that according to the fuliginouſneſs of vapours more or leſs recoiling, the fire is more or leſs choaked. Nay if we will believe *Hiſtorians*, there have been burning Lamps cloſely ſhut up in glaſſes for fiftheen hundred years together in old ſepulchres; Now they burnt without air, & were not extinguiſhed by reaſon the aliment of it was a Naphtha, or Bituminous matter, which was ſo pure that it bred no fuliginous vapours to choake the fire thereof.

3. Where this fire is very great, there is a great vent, and exhalation, but where but little, little is the vent, and inſenſible. And in moſt places the fire is not great extenſively, but intenſively, becauſe it is kept within a narrow compaſs, as in ſmall caverns and veins of the earth.

Q. How comes this Bitumen to be kindled in the earth?

Sol. It is agreed by all that are of the opinion that Bitumen is the matter of the ſubterraneal fire, that hot and dry exhalations in the bowels of the earth being ſhut up, and not finding any place to break forth, are agitated, attenuated, rarified, and ſo inflamed, and being inflamed kindle the Bitumen.

Now laſtly let no man wonder that there ſhould be ſo great a force of fire conteined in the earth as to be ſufficient for the generation of ſo many Springs that flow from thence daylie, ſeeing *Pliny* and many other Philoſophers wonder ſo much on the other ſide, when they conſidered of the ſubterraneal fire, and brake forth into an exclamation, ſaying, it is the greateſt of all miracles that all things are not every day burnt up. And cannot the burnings of the *Ætnean*, *Viſuvian*, *Nymphean* mountains convince us a little of this? But for the further confirmation of this opinion, let us a little conſider whence the winds proceed, and what they are. And are they not a hot and dry exhalation? Now that this proceeds from, and out of

of the earth, moſt agree: and that it entered not firſt into the earth is very probable: For how can a hot, dry, light exhalation, whoſe nature, and property is to aſcend, deſcend into the earth in ſuch a quantity, as to cauſe ſuch great and laſting winds, as many times happen? It muſt therefore be in the earth originally, and be ſtirred up by ſome great heat in the ſame. And what ſhall we think of the dry exhalation or ſpirit which is ſhut up in the caverns of the earth in great quantities, and endeavouring to break forth through obſtructed paſſages cauſeth great earth-quakes whereby Cities, Towns, and Countries have been overthrown, to ſay nothing of thoſe dreadfull noyſes ſometimes in the bowels of the earth? Whence I ſay theſe great exhalations (I ſay great, becauſe I confeſs that ſome little quantity of them may be cauſed by certain fermentations in the earth) ſhould be raiſed, if not from ſome great heat of fire within the earth, never any one yet could rationally determine.

And *Cæſius* affirms that at a cerain village called *Tripergulus* about an hundred and twenty years ſince, after fifteen dayes earth-quake the earth opened, and winds, ſmoak, and very great fires brake forth out of the ſame, alſo pumice-ſtones, and abundance of aſhes, in ſo much as they made a mountain, and about that place were many hot Springs. Alſo in *Apulia* is a hot bath called *Tribulus*, where there is abundance of aſhes

and calcined ſtones; and about the lake *Lucrinus* and *Avernus* are the ſame.

But if any ſhould yet doubt that winds proceed from the earth or from the occult fires of the earth, I ſhall make it yet further to appear by propounding to their conſideration ſome obſervations concerning the Sea. For it is obſerved that wind doth proceed from the Sea, after a more apparent, and violent manner, than from the land, and that more certain ſignes of an enſueing wind are taken from the Sea, than from the land. For when a calme Sea makes a murmuring noyſe within it ſelf, it ſignifies that then the exhalations, which is the matter of the wind are riſing out of the earth, and bottom of the Sea; and this the fiſhes perceiving, and being affraid of it, eſpecially Dolphins, play above the water, and the Sea-urchins faſten themſelves to rocks: the Sea a little ſwelling ſheweth that the exhalation is endeavouring a vent; then boyling ſheweth that it hath penetrated to the ſuperficies, but as yet in a little quantity: but then the eruptious of the exhalations following upon the waters mounted up aloft, make wind, and a tempeſt; ſuch as Marriners have often experience of, when as they perceive that the wind blows from no other place, but ariſeth at themſelves. Now why waves or billows ſhould precee d wind, let any man if he can give any other reaſon.

Alſo I have been informed by ſome Marriners

riners, that a little before a great tempeſt there is ſeen a great quantity of an unctuous ſhineing matter floating on the top of the Sea, and that this is an infallible ſigne of an enſuing ſtorme. The reaſon of this is becauſe wind breaking forth out of the earth, forceth up with it ſelf that Bituminous matter from the place where it ſelf was generated.

But now why winds ſhould ariſe from the Sea more apparently than from the land, is becauſe there is more plenty of fire in the gulfes of the Sea, for there it hath more aliment or fewel, *viz.* Water, which as I ſaid before, is the aliment of that Bituminous fire. And whence are thoſe great mountains of ſtones and minerals, and thoſe Iſlands, which do ſometimes ariſe up anew from the Sea, but from a ſubterraneal fire, which forceth them up from thence (according to the judgement of learned *Sendivogius*, and experienced *Erker*) and thoſe chaſmes, and gapings of the Sea?

Much more might be alleadged for the confirmation of this opinion, as the manner of the generation of minerals, and metals, and many ſuch like ſubterraneal operations, which can not rationally be aſcribed to any other cauſe, than fire within the earth; but all the premiſes being ſeriouſly weighed, & impartially conſidered, I ſuppoſe there are but few but will conclude, that as all Springs proceed from the Sea through ſubterraneal channels and caverns, ſo alſo are diſtilled up to the heads

heads of Fountains by a ſubterraneal bituminous fire. And as for thoſe that are not yet ſatisfied let them conſult with the treatiſe of our late, and learned Countryman *Mr. Thomas Lydyat*, entituled *Diſquiſitio phyſiologica de origine fontium*, and there they ſhall find this opinion rationally diſcuſſed, and ſolidly confirmed: but if yet they ſhall be left vnſatisfied, let them produce a more rational account of any other opinion, that will hold water in all reſpects better than this of mine doth, and I ſhall thanke him and embrace it.

And thus much for the original of Fountaines in general, I ſhall now proceed to treat of the nature of Springs in particular.

Chap. III

Of the ſtrange variety of Fountains, and other Waters.

NAture hath not diſcovered her ſelfe ſo variouſly wonderful in any thing as in the Waters of Fountains, Rivers, &c. Some of which ſtrange waters I ſhall reckon up, that it may be the better conceived how variouſly ſubterranealls communicate their vertues to this Element. Now the wonderfulnes of waters that I ſhall mention, conſiſts either in the ſtrangeneſs of their colours, taſts, odours, ſounds, weight, obſervation of time, & effects.

1. Strange

1. Srange Colours. *Athenæus* makes mention of a Lake of *Babylonia*, that in Summer-time for ſome few dayes is red.

He alſo ſaith that the water of *Boryſthenes* is blew in Summer-time.

Pauſanus mentions a certain water at the *Town Joppe* and in *Aſtyris*, that is yellow.

Cardanus ſpeakes of a white water in the River *Radera* of *Miſena*.

He alſo ſayes there is a green water in the Mountain *Carpatus*.

He makes report of a black water in *Allera*, a River of *Saxonia*.

Scaliger reports that the Fountain *Job* in *Idumea* changeth colours four times in a year.

2. Srange Taſts. *Agricola* makes mention of ſweet water in *Cardia* neer *Daſcylus*, and *Puteolana* neer the cave called *Sybill*.

Ariſtotle relates of a water in *Sicania*, of *Sicilia*, which is uſed inſteed of vinegar, and pickle.

Rulandus alſo makes a report of a ſoure water in *Mendick* and *Ponterbon*.

Cæſius ſpeakes of a bitter and ſalt water in *Palaſtina* in which Fiſh can not live, of the ſame taſt is the ſulphur Well in *York-ſhire*.

Cauſſinus ſaith that the River *Hyſpanis* is as ſweet as Honey in the beginning, and acide at the end.

Pliny relates that in the country of the *Troglodytæ*, there is a Spring called *Fons Solis*, (i.e.) the Fountaine of the Sun, which alters its taſt according to the riſing, and ſetting of the Sun.

Mutianus saith that the Fountain *Diotecnosia* in the *Isle Andros* hath the taſt of Wine.

Salt waters in *York-ſhire*, *Spain*, *Italy*, *Sicilia*, and divers other places.

Nitrous water in *Lotis* of *Macedonia*, and at *Epſome*, and *Scarborow*, *&c.*

Aſtringing waters, as Alluminous, and Vitrioline almoſt every where.

Corroding water is in the River *Styx*, the water whereof being put into a Silver, Copper, or Iron veſſell, corrodes its way through the ſame.

Fat waters as they are taſtable may be mentioned in this place, and many of this ſort ſaith *Cæſius* are in *Germany*, *Italy*, *Macedonia*, and other places.

3. Strange Odours. *Pauſanus* ſaith that in *Peloponneſus* is a water that hath a very fragrant ſmell.

He alſo ſaith that in the *Town* of *Elis* the water of the River *Aniger* is of ſuch a horrid ſmell, that it kills both man, and beaſt.

Ariſtotle makes mention of a water not far from the River *Aridanus*, which is hot and ſendeth forth ſuch a ſtanch the nothing can drink of it, and kills all birds that fly over it.

Cæſius reports of *Arethuſa* a River of *Sicilia*, that it ſmells like dung at certain ſeaſons.

The Sulphur-Well in *York-ſhire* ſmells like the ſcouring of a Gun that is very fowl.

4 Strange Sounds. *Pliny* makes mention of a Fountain of *Zama* in *Affrica*, that makes mellodious ſounds.

Vitruvius

Vitruvius reports that a Fountain in *Magnesia*, hath a tunable sound.

5. Strange Weight, and that either in relation to themselves as being heavy, or light, or to other things put into them.

Plutarch makes mention of a River called *Pangeus*, a vessel of the water whereof weighs twice as heavy in Winter as in Summer.

Strabo saith that the water of the River *Euleus* is fifteen times lighter than any other water.

Seneca writes that in *Syria* there was a Lake called *Asphalites*, in which no heavy thing could sink.

Cæsius saith that the Lake *Alcigonius* in *Lerna* is of that nature, that if any go into it to swim, he should certainly be drowned.

Strabo writes that amongst the *Indians* in a mountainous Countrey there was a River called *Sibis*, on which nothing could swim, which River saith *Caussinus* is an emblem of ambition, because it will suffer nothing to be above it. Some Rivers run over Lakes and will not mix with them, as *Marcia* over *Fucinus*, *Addua* over *Larus*, and divers other there are of this nature.

Some Rivers run under the bottom of the Sea, and will not mix with it, as *Lycus* in *Asia*, *Erasinas* in *Argolica*.

Athenæus saith that in *Tenos* is a Fountain that will not mix with Wine: but will fall alwayes beneath it.

6. Strange observations of times.

Cardanus mentions a Spring called *Fons Sabbaticus*, that flowes all the six dayes of the week, but is dryed up the Sabbath day.

Caussinus relates that the Fountain *Vmbria*, flowes onely against a time of famine.

Ovid writes that the water of *Pheneus* is unwholsome by night, but wholsome by day.

Solinus reports that in *Helesinâ Regione*, a Fountain otherwise still and quiet doth at the sound of a pipe rejoycingly exult and leap up.

Ovid saith that the Fountain of *Jupiter Hammon* is cold by day, and hot by night.

7. Strange effects.

The River *Styx* kills all them that drink of it, as is agreed by all Historians.

Strabo writes that in *Palestina* the Lake *Gardarenus* makes the nails, horns, hair, fall off from those beasts that drink thereof.

Pomponius Mela saith in *Insula Fortunata* is a water that makes them that drink of it to laugh to death.

Pompeius Festus reports that the Fountain *Salmacis* inclines men to venery.

Vitruvius relates that the Fountain *Clitorius* makes them that drink of it to abhor wine.

Ovid saith that the Fountain *Lyncestus* makes men drunk.

Pliny makes mention of a Fountain that makes men mad.

Pliny reports that the *Dodonean* Fountain will

will quench lighted torches, but kindle those that are extinguished.

Heurnius saith that he saw amongst the *Eugeneans* a certain Fountain that would turn divers things to stone, that were cast into it: *H. ab Heers*, and Doctor *Jorden* reckon up many of this nature, whereof some will couvert things into stone in a short time, and some in a longer, and some onely crust over things as that dropping Well at *Knaresborow*, unles it sinks into things, as leaves, mosse, and all those it converts to a stoney substance.

Maginus makes mention of a Lake in *Ireland*, in the bottone whereof if you put a staff, it will being pulled out some moneths after, be turned into Iron *viz.* that part which stuck in the mud, and that part which was in the water into a whetstone.

Aristotle mentions a certain Fountain in *Sicilia*, into which if living creatures being before killed, were put, they would become alive again.

Athenæus saith that the fish of the River *Clitoris* have a certain voyce.

Solinus speaks of a Fountain that is in *Bœotia*, which helpeth the memory.

Isidorus saith the like of the River *Lethe* which causeth forgetfulnes.

Scaliger saith that the River of *Juverna*, is of that nature, that the leaves of a certain tree hanging over, falling into it, become living fishes.

Pliny reports that in *Agro Carrinatis* in *Spain* is a certain Fountain, which makes all the fish that live in the water of it seem to be of a golden colour.

Agricola affirmes that fishes live in the hot Sulphur-waters of the lower *Pannonia* neer *Buda*.

Varro, and *Solinus* affirm that there is a Fountain in *Arabia*, which, if the sheep drink thereof, changeth the colour of their fleeces, and maketh the white to become black.

Pliny reports that the water in *Falisco* maketh the Cattle that drink thereof, to become white.

He also saith that in *Pontus* the River *Astaces* watering the fields, makes the Mares that feed therein to yield a black milk, which feeds the Countrey.

It is reported that in *Ulcester* in *Ireland*, there is a Fountain, in which he that washeth himself shall never become gray.

I could recken up many more waters of very strange natures, but whether they, or these already mentioned be all certainly true, I will not undertake to affirm, onely thus much I will say, that some of them, I my self have seen, other some I am assured of from those whose unquestionable worth may justly command mine, and other mens faith to their indeniable testimony, and for the rest we may believe them according to the reputation of the Historian. These here I mentioned that it might not seeme strange to us,

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how capable waters are of receiving diverſity of qualifications from the earth: and although ſome of them may ſeem magical, and ſupernatural, yet may they upon a profound enquiry be made to appear truely natural.

Chap. IV.

Of the nature, and vertues of ſimple Waters.

It will be neceſſary for the better conceiveing of the nature, and vertue of mineral waters in particular, to ſpeak ſomething of the nature, and virtues of water in generall, or of ſimple water, which is an element, as ſaith *Sendivogius*, moſt heavy, full of unctuous flegme, and is more worthy in its kind than the earth; it is without volatile, but within fixed; cold and moiſt, attempered by air. It is the Sperm of the world, in which the ſeed of all things is preſerved, and it is the keeper of every thing. It is called by the ancients Πανσπερμια. *Thales* as ſaith *Ariſtotle* called one and the ſame water the beginning of all things. *Empedocles* alſo believed that of water were all things made. *Hippon* alſo ſaith *Ariſtotle* called it the ſoul of things, as if it were the life of them, which made *Hippocrates* ſay that water and fire were the principles of life, and eſpeciallyi water, for ſaith he, many animals may want fire, but none can well live without water. *Theophraſtus* affirms that water is the matter of all things. And indeed

deed if water were accurately anotamized you ſhould clearly ſee that both vegetables, minerals and animals are generated of water, but of this I have treated more largely elſe where: I ſhall not now ſtand to repeat, eſpecially ſince my purpoſe here is chiefly to ſpeak of the medicinal virtues of water.

Now we muſt know that water is two-fold, for either it is ſimple or mineral, which we more uſually call medicinal. Water is called ſimple, not according to its own nature, but to our ſenſe, or being compared with that which is mineral, and of this there are five kinds, *viz.* rain, fountain, pit, river, and ſtanding water.

I ſhall not here ſtand to prove whether or no water be nutritive, or be onely a *vehiculum* of aliments, as *Galen* would have it, becauſe in another treatiſe I have cleerly ſhewed how vegetables, animals and minerals are generated of, and increaſed by water, which hath ſuch ſtrange diſſimilary, or heterogeneal parts as can ſcarce be believed by thoſe who never ſaw the ſpagyrical anatomy thereof, or curiouſly examined the production of all natural things. I ſhall inſiſt onely upon the medicinal uſe thereof, as being adminiſtred either to prevent or cure the diſtempers of the body.

Simple water which cooles, and moiſtens, is either taken inwardly, or uſed outwardly.

It is taken inwardly either warm, or cold.

The vertues of warme-water taken inwardly

vardly are these, which follow. *viz.*

1. It doth by reason of its warmth cause nauseousness, and it is drank in a greater quantity to cause vomiting in head-ach proceeding from drunkenness, and in any other ilnes's of stomack; but with this caution, that they that have very cold, weak and laxated stomacks must abstain from this kind of vomit, because warm water doth moisten very much, and so by consequence would laxate the stomack more than it was before. Also it is not to be administred to those that are accustomed to drinking of water, for them it will not move to vomit, but remain in the body, and weaken the vessels upon the aforesaid account of its extream moistening.

2. It allayes sharp, acid, and gnawing humours, and cureth such symptoms as proceed from thence, as saith *Galen*; also it represseth the ebullition of choller, and helps the inflammations of the throat, and mouth caused thereby as saith *Aetius*.

3. It cures the inflammation of the reins by altering of them, if it be taken before meals.

Note that if warm water be given to cause vomiting, it must be administered to the quantity of a pint or two, or of as much as will be sufficient thereunto. But if it be used for qualification it must be taken to the quantity of a cup onely, which may not cause nauseousnes.

The use and vertues of cold water are these *viz.*

1. It conduceth to long life in regard it condenseth the spirits saith the *Lord Virulam*. And indeed water was the usual drink of the ancients who lived long.

2. It repels by reason of its coldness, and is therefore effectual against divers distempers; it forceth crudities out of the stomack, and as saith *Aetius*, promotes the operation of any medicine that is taken, and works not: besides it suppresseth the fuming of vapours to the head as saith *Dioscorides*, and *Mesues*, and being drunk at bed-time causeth quiet rest, as saith the *Lord Virulam* in his learned treatise *de vita, et morte*, by suppressing the ascent of vapours to the head.

3. It allayes extream hot distempers, whether they be in any particular part, as in the stomack, liver &c, or in the whole body, as in continual, and burning feavers. It is upon this account commended by *Galen* against an inward *Erisipelas*. I know some that account it, especially rain water, as a great secret against ulcers of the reins.

Note that cold water is prohibited from a cold temper either of the whole, or of principal parts, also from old age, because it is very feeble, and from child-hood because it is subject to convulsions as saith *Galen*, and from a thin habit of body extenuated by reason of scarcity of bloud, which is a great, and the principal safeguard against cold

things

things. Winter alſo, and a cold, craſs ſlimy morbifick, or a hot impact matter, as alſo great obſtructions of the veſſels, and cold inward tumours forbid the uſe of cold water.

As for the time when cold water is to be drank, note that it is never to be adminiſtred in feavers, unleſs concoction do firſt appear, as ſaith *Galen*, for although it be a remedy for a feaver as it is a feaver, yet it is not a remedy againſt the humours which cauſe a feaver, but as it evacuates them by Urine ſtool, or ſweat. But theſe cannot ſafely be expelled before they be concocted. Now we muſt not notwithſtanding expect a perfect and full concoction, but it will ſuffice if it be moderate and in good part performed, for elſe there will be a danger of the feavers turning into a Hectick. Alſo it muſt not be taken on the critical day, for then ſaith *Hippocrates* we muſt not move the humours, becauſe we do not certainly know which way nature will attempt an evacuation. But for a more particular time of the feaver it is to be taken moſt conveniently in the fit, or in the very hour of the ebullition of the humours, becauſe then the inward parts do burn moſt, and need moſt then to be qualified, beſides coldneſs is then leaſt offenſive, becauſe the greatneſs of the heat is a ſafeguard againſt the offenſiveneſs thereof.

As for the quantity to be drunke, note that if the repelling, or ſuppreſſing vertue thereof be required, it is to be taken to the

quantity of half a pint, more or less as things may be considered. But if the altering or allaying vertue, as in a feaver, then it is to be taken in such a quantity as maybe drunk at one breath, or as much as the sick party needs for satisfaction, or elss can well bear. But the greatness of the distemper, the age, time of the year, custome, and strength is also to be considered.

But it will be demanded which is the best water, and most wholsome; and for answer hereunto, I say that is the best which is void of taste or odour, is clear, pure, most light, is soon heated, and soon cooled, and in which flesh is sooneſt boyled, and in particular as saith *Galen* rain water is the best, but yet not any, but such which falls in Summer-time when the heaven is in great part serene, and especially with thunder, being that which consists of thinner vapours, elevated and purified by the heat of the Sun and lightning. And next to this is that pit water, which flows from the next fountain, or river especially through a sandy earth, because if the said earth partake of no other quality, it is percolated, made more thin, and becomes more depurated than other water. And in defect of these two, fountain and river water may be used, being indeed very good and wholsome, and indeed are by many accounted the best: but the worst of all is standing water as lakes, pooles. Now in case there can be got no good water, but onely what

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is bad, than *Galen* would have that to be boyled, and cooled again, and so to be used. Thus much of the use and vertues of cold, and warm water administred inwardly.

It remaines now that I speak two or three words of the external use of water both warm and cold, and of the effects thereof. Now water is used outwardly saith *Julius Cæsar Claudinus* first by way of *Balneum*, or bathing the whole body, secondly by way of *insessus* or sitting in water up to the navel, thirdly by way of aspersion or affusion (i.e.) sprinkling or pouring on, fourthly by way of *stillicidium*, dropping or distilling. Fiftly by way of fomentation, and lastly by way of lotion or washing any part.

Bathes are either hot, or cold.

Cold Bathes were by ancient and modern Philosophers, and Physitians ordeined for divers uses. Many used them onely by way of exercise as for swimming in them, which the *Lord Verulam* in his learned treatise *de vitâ & morte* reckons up as one of those robust exercises, as he calls them, which makes the flesh hard, and compact, conducing to long life.

They are used also for the astringing of the body, and condensing the same, also as saith the foresaid *Learned Vicount* for the closing of the pores of the body that are too open, whereby the hot air excluded from preying upon the body, besides they unite the *Calidum innatum*, corroborating the same by an *antiperistasis* wherby by cõsequence it doth beget

a good appetite, cauſe a good digeſtion, excite the expulſion of excrements, repreſſe a canine appetite, & other ill ſymptomes cauſed by the exolution of the skin, ſtop bleeding, the overflowings in women, and the gonorrhea, cure the *Hydrophobia* which is a ſymptome occaſioned by the biting of a mad dog, and many ſorts of feavers both intermitting, and continual; if the party make uſe of them when that fit is approaching, and there continue an houre or two.

Note that the uſe of cold baths is not for youths, becauſe they hinder their growth, nor for old men, becauſe that little heat which they have is thereby ſuffocated, nor for cold and thin women which have delicate bodies, becauſe the cold penetrates too much into their ſolide parts, nor to any that be ſick, unles they be of ſtrong natures (for as cold baths doe wõderfully corroborate the *Calidum innatum*, or naturall heat if it be ſtrong, ſo doe they on the contrary overcome it if it be weak) and the humours appeare to be concocted and fit for evacuation, and no principal part, or bones, nerves, brain ill affected, and the body free from convulſions.

Note alſo that when the intenſion is to be formed by cooling onely, and there is no need of moiſtening, then as ſaith the aforeſaid authour of the *Hiſtory of life and death*, the body is to be annointed with oyle, with ſpiſſaments or thickeners that the quality onely

onely of the cooler be received, and not the ſubſtance. Yet we muſt in ſuch caſes have a care that the pores of the body be not thereby ſtopt too much, for when any extrinſecal cold obſtructs the body too much, it is ſo far from cooling it, that it ſtirs up the heat the more, by ſuppreſſing perſpirations.

Baths alſo of hot or heated water are of great uſe; but before I declare the uſes and effects thereof, wee muſt confider that they are of three ſorts, for either they are tepid, (i.e.) Luke-warm, or moderatly hot, or very hot water.

A Bath that is very hot dryes rather than moiſtens, contracts the skin, condenſeth the pores thereof, ſo that neither any external humiditity can be received in, or internal ſuperfluities expelled forth thereby. So that there is no great uſe thereof, onely it ſerves for the contracting of the skin where it needs contraction, & where the uſe of a cold Bath may not be admitted ſafely for that intenſion.

A Bath that is moderately hot ſerves for divers uſes, and is very neceſſary in ſeveral caſes.

It draws from remote internal parts, and cauſeth hot humours to be digeſted into vapours, and openeth the pores, that the offenſive humours, and vapours may be evacuated by ſweat, and perſpirations. It moiſteneth a dry body and therefore, is very good in a putrid and hectick feaver, in the itch, and ſcab, &c. attracts nouriſhment [to the extreame

parts,

parts, where before by reaſon of ſome defect it came not, allayeth the ſharpnes of humours in the habit of the body, and upon all theſe accoũts ſerves as effectually, if not more, for moſt intenſions, that almoſt any Phyſick is preſcribed for. I ſhall onely add to theſe the great vertues that *Columella* attributes to Baths of hot water; for ſaith he, we do concoct our crudities by the uſe of Baths. And for this end they were much uſed by the ancient *Romanes*, who uſed a crude kind of dyet as of hearbs, and raw fruits, which bred crude humours in their bodies, and therefore needed ſome ſuch help to concoct them, and by this meanes they became very healthfull, and of delicate bodies. But they muſt be uſed for the concocting of crudities with this caution, *viz.* that there be no feaver preſent, for then inſteed of concocting of them they will become by being ſtirred, more putrid, and by being attracted to the habit of the body, as of neceſſity they muſt by the uſe of hot Baths, obſtruct the pores thereof, to the increaſing of the feaver; and in caſe of a feaver, hot Baths muſt be uſed in the declining thereof as when concoction appeares, and after purging of the groſſe humours, abound in the firſt veſſels, but in other caſes *Hippocrates* commends Bathing as a preparative to purgations.

A tepid Bath cools as well as heats, and heats as well as cools, and ſerves for the ſame uſes as a hot Bath doth but more remiſly.

Note

Note that if the patient that is bathing be subject to faint, he must hold cold water constantly in his mouth, and drink ever and anon a draught of cold beer or water.

I might here prescribe many rules and directions for bathing, or for the ordering of ones self before, in, and after bathing, but it was not my purpose to make a full, and large discourse of this subject, onely to touch it by the way, referring those that stand in need of bathing to their skilful Physitians for their directions.

To this kind of bathing, *viz.* with hot water, I might add the manner of bathing by vapour, which is when a vessel of seething water close covered hath proceeding from it a long pipe, which is fastened into a bathing tub, into which the hot vapours come upon the patient there sitting: but of this I have treated more largely in another discourse, and will not now repeat.

The second way of using water outwardly is called insession or sitting in water up to the navel, and this is used when the weakness of the body cannot bear a bathing of the whole body, and particularly it is made use of, if warm, for laxating, & mollifying the hardness of the belly, for provoking of Urine, the mitigating of the pains of the stone, and chollick, &c, and if cold, for the performing of the same intensions for the lower part of the body, as a cold *Balneum* doth for the whole.

The four last ways of using water outwardly, as aspersion (i.e.) sprinkling, or affusion, *Stillicidium* (i.e.) dropping or distilling, fomenting, and lotion respect parts, with the like operations upon them (although with some kind of variety of application) as baths do the whole body. They that will understand more these external uses of cold and hot water, let them read *Claudinus* his treatise *de Ingressu ad Infirmos*, and *Galen de tuenda Sanitate*.

Note that that water is best for outward uses which will beat sope best, and make the greatest fome therewith.

And thus much for the vertues, and inward, and outward use of simple water, whether hot or cold, and that in brief, for I would not dwell upon this subject, as not being the chiefest that I propounded to my self to discourse of in this treatise, taking it in onely by the way and for order sake, and the better illustrating of that which follows, and is principally to be here treated of.

CHAP. V.

Of the several kinds of mixtures in mineral waters.

IT is graunted by all that there is some kind of mixture in all mineral waters: & indeed there are four kinds of things that are usually

ally mixed with these kinds of waters, viz. Metals, Minerals, Stones, and Earths; and of some of these, 1. Sometimes the vapours onely are mixed, viz. Such as arise from the fermentation, and dissolution of Metals, and Minerals, and are mixed with the water that passeth by them through the veins of the earth. And concerning this, saith *Aristotle*, that the vapours of Minerals keep the tast, and odour of the Minerals from whence they proceed: but of this more fully in the *Chapter of the Spaw*. 2. Sometimes the juice onely of them, viz. Whilest they are in *principiis solutis*. And indeed gold can be mixed with waters no otherwise, because it cannot be corroded with the acid spirits of the earth, as other Metals can, having in it self when concocted, and perfected none of that crude fine acid salt, which a subterraneal aciditie will resolve and set at liberty to corrode the Metal with which it is *per minima* together with the embrionated Sulphur of the same conjoyned. 3. Sometimes the substances, and that after a threefold manner, for some are mixed with water so very close together, that from the mixture of them there results but one forme, neither will they ever or scarcely be seperated, and such are those that will not vapour away faster than the water it self is evaporated, neither remaines in the bottom, but is all evaporated with the water. Some are mixed confusedly, Such as subside or fall to the bottom, if the water be

put into any vessel, that it may stand still. And lastly some are mixed in a way betwixt both, as salt; for salt and the water continue to be in one and the same form, but yet the salt will subside and remain in the bottom after evaporation of the water.

Now the cause of this variety of mixtion is either the difference of the heat that should unite, or of their abode together, or else of the aptness of the things, to be mixed, for mixtion.

This being premised, I shall proceed to relate where these Springs, and waters are found, which are impregnated with the aforesaid four kinds of Ingredients.

1. Of *Metals*

Gold is said to be found mixed with *Balneis Ficuncellensibus, Fabariis, Piperinis*, &c.

Silver, in a certain Spring in *Hungarie*, and in the Bath at *Bol.* &c.

Copper, in the Bath of *Saint Mary's* in *Flaminia* in *Thermis Cellensibus* in *Suevia*, and in many places in *Germany*. &c.

Iron, in Springs in *Agro Lucensi* in *Asatia*, in *Agro Calderiano* and divers in *England*.

Lead, in *Lorayne*, whence a certain Bath there is called *Balneum Plumbaceum*.

Quick-silver, in *Serra Mordena* in *Spain*, near the village *Almedica* in a cave, where they say are many wells infected therewith.

2. Of *Minerals*.

Sulphur is said to be found in *Thermis Pu-*

teolanis

teolanis, *Aponitanis*, & *Badenſibus* in *Helvetia*, and thoſe at *Knaresborow*.

Antimony, in *Germany*, and in a certain Spring at *Meldula*, as alſo in divers other purging waters.

Arſenick, and *Auripgimentum* in the lake *Avernus*.

Bitumen, in the wells at *Baia Mutina* and thoſe at *Knareſborow* called the *Sulphur-wells*.

Salt in *Balneis agri Piſtorienſis*, & *Volaterrani* and in the *Sulphur-well* at *Knareſborow*.

Nitre, in *Agro Puteolano* of *Campania*, in *Ægypt* and divers other places where the waters are very nitrous.

Allum, in *Balneis Agri Senenſis*, & *Lucenſis*, and in ſome Springs in the North of *England*.

Vitriol, in *agro Volaterrano*, and thoſe *Spaw*-wells in *Germany*, and theſe in *England*.

3. Of Stones.

Plaiſter, in a Spring of the Mountain *Grotus* in *agro Pataviano*.

Lime-ſtones, in Springs of chalkie countries, where the water ſometimes runs forth white.

Marble, in a Bath in *agro Agnano*.

4. Of Earth.

Potters clay, in a bath of the mountain *Orthonus*.

Rubrick, or a certain red earth (for ſo ſometimes it ſignifies) in *aquis Calderianis*.

Marle, in *Oaxes* a river of *Scythia*, &c.

But of all theſe by the way onely and for method ſake, and alſo for the better under-

ſtanding of what is behind, and indeed is the chiefeſt ſubject of this preſent treatiſe.

Chap. VI.

Of the Original of Vitriol, and the cauſes of Vitrioline waters, or Spawes, difference of them the one from the other, and the reaſons of their different operations.

IN the firſt place I ſhall give a deſcription of Vitriol (in which ſhall be declared the cauſes thereof) and explain the terms thereof, difficult and not obvious to every ones apprehenſion, as being not uſual in common natural Philoſophy.

Vitrial therefore is but an eſurine acid Salt, of the embrionated Sulphur of Copper, or Iron, which attracting an acidity from air, or water is thereby opened, and reſolved, and then corrodes the parts of the ſaid metals, with which it is connate, the body of which compound, conſiſting of Pure Metall and ſuperfluos Sulphur, and Salt, being thus opened is diſſolved in water paſſing through the veins thereof: And this water thus impregnated is boiled to a Vitrial.

The difficult terms hereof I thus explain.

1, By embrionated Sulphur I underſtand a ſu-

a superfluous sulphur, which is not the matter of the Metals, but connate onely with them for the embrional conservation of them, and after the perfection of the Metal is cast off in part by nature, and more fully by the refiners fire. *Paracelsus* explaines it by a familiar example of a Nut. A Nut saith he *per se* is onely the kernel, which is not generated by it self, but together with the shell, and shales, which are superfluous, and serve onely for the embrional conservation of the Nut, that is, of it whilest it is in an *Embrio* or imperfect. And here by the way note that as every Mineral, Metal, and vegetable hath its distinct *Sulphur Embrionatum*, so every *Sulphur Embrionatum* is distinct from the true genuine thing generated, with which it is connate, as much as a form, essence, substance, and corporality differ the one from the other, and is but an impurity of its *Embrio*, and as it were as *Helmont* calls it, the secundine thereof.

2. By esurine salt I understand in this place (not the acid spirit of air, water, and subterraneal sulphurious vapours, not yet coagulated or specificated, which also are sometimes called an acid or esurine salt, but) a certain acid vapour applicable to all Metals and Minerals, and connate with them in their *principiis solutis*, and *Embrioes*, and especially to those that abound with sulphur, as Iron, and Copper, and with them congealed into a saline principle, giving consistency to the *com-*

positum

positum, as sulphur doth coagulation; and is by Hel-mont for want of another name called the *esurine salt of an embrionated sulphur.* (But any one may call it what he please, if so be he understand it) and is resolved, and unlooſed by an acid spirit conteined in air, and water, which spirit is indeed the seed of salt (for in them *viz.* in air and water, are the seeds of all things, in the former as being therein imagined, as saith *Sendivogius*, as in the male, and in the latter, as being afterward by a circulative motion cast forth into the same as into their sperm (for he makes a subtile distinction betwixt seed, and sperm) wherein they are conserved, taking not upon them the nature of any specifical salt, untill they meet with some corporeal principles that are consentaneous to them) and is, when it meets with any saline corporeal principle in its resolving of it coagulated together with the same into a distinct species of salt, *viz.* into this or that according to the nature of the compositum; where this solution, and coagulation is made.

I shall for the better illustration of this nativity of salts, briefly shew how two of the four said salts, *viz.* Nitre and vitrial are made artificially, because this artificial process is performed in imitation of the natural production of them.

1. The process therefore of making nitre artificially is this, *viz.* Sprinkle distilled vineger upon fat earth, as fullers earth, bole, marle,

marle, &c. beaten ſmall, and let it ſtand for a few dayes in a cold place, and you will ſee pure nitre produced from thence. Or take any one of the aforeſaid earths, and beat it ſmall, and ſet it in a cold moiſt place for ſome weeks, and you will ſee the ſame effect. Now this latter way ſeems as much natural as artificial, and indeed it is juſt in imitation of nature: for we ſee that any fat earth, if it be covered from rain, and the Sun, ſo as it ſpendeth not its ſtrength in producing of hearbs and plants, breedeth plenty of nitre.

Now note that in theſe kinds of fat earths there is at firſt obſerved no nitrous taſt, neither can there from thence be extracted any nitre, but after they have continued a certain time in the cold air, do by a certain magnetick power of a nitrous principle, or ſaline unctuoſity which is in them, attract an acidity, or rather acid ſpirit, which opens the bodies of thoſe fat earths, and reſolves the ſaid ſaline unctuoſity, and is therewith coagulated, (for the ſolution of the one, is the coagulation of the other) and after this manner is the nativity of nitre.

2. The proceſs of making artificial Vitrial is manifold, I ſhall ſpeak of onely two, and they are theſe.

1. Caſt Sulphur into melted Copper, and there let it burn till it ceaſe to burn any more, then preſently caſt the melted Copper into rain-water, which will thereby become green. This do ſo often till all the Cop-

per be dissolved in the water: then evaporate the water, and you shall have a good Vitrial.

Note that it is an acid spirit in the sulphur, which opens and resolves the esutine Salt in the Copper, whereby the Copper it self is corroded, and fit for dissolution in the water.

2. Take Copperas stone, which is a certain Sulphurious glittering Marcasite, break to pieces a good quantity of them, and lay them in air, and rain, upon sticks over wooden vessels, and in a certain time the stones will be resolved by an acid spirit in the air, and water, and washed down into the said vessel with the rain-water, which will thereby become green, and yield upon evaporation a good green Vitrial: and after this manner do we make our Vitrial, or Copperas in *England*.

Now let it not seem strange to any one, that there is such an acidity in water, and air; for whence else doth Iron, and Copper, being put into water, or standing long in the air, especially in a cold Cellar contract such a rust as they do? Is not this rust from the aforesaid acid spirit, *viz.* of the air and water, resolving the erusine Salt in those metals, and making it thereby more corrosive, and more powerfull to corrode part of the metals themselves, with which it is mixed *per Minima*? And will not this rust being boiled in rain-water yield a Vitrial?

Ob. But some will object, and say, that this rust is caused not from the acidity, but onely from

from the humidity of the air, and water, resolving thereby the said esurine Salt.

Sol. This I will solve with a relation of two experiments, *viz.*

1. Take the above named Copperas stones broken to pieces, weigh them exactly, and lay them in a cold moist place, (but so that no rain come at them to wash away the Salt thereof, as it is resolved by the acidity of the air,) and after some moneths they will, by a certain magnetical power, attract a certain saline humidity, and fall into a black pouder, which being well dried, and then weighed, will prove far more ponderous than before, which implies that there is an addition of something else than a meer quality, *viz.* the humidity of air, and water.

2. Take a pound of Salt of tartar, make it red hot, and weigh it exactly, then put upon it two pints of rain-water distilled, and evaporate it, then put on more, and evaporate that also, and then make the Salt red hot again, and weigh it, and you shall find it far heavier than before, which is caused by the said Salts attracting to it self that occult acid saline spirit, which was in the water, and fixing of it into its own nature; and not by assimilating the water it self, which will never be converted into Salt any otherwise than as it contains a saline acid spirit, which is the onely thing coagulable in it.

Ob. Some again will object, although they do admit of this acid spirit in air, and water,

& ſay that in caſe the ſaid acid ſpirit do corrode and diſſolve the metals, it doth not follow that there is any ſuch eſurine Salt in thoſe metals, as diſtinct from the pure mercurial, or other Sulphureous part of them, but ſay that it corrodes onely the ſaid mercurial, and Sulphureous part thereof, as we ſee *aqua fortis* doth ſilver, and *mercury*, and *aqua regia* doth gold, and ſo becomes coagulated into a ſaline nature, and conſiſtency.

Sol. The ſaid acid ſpirit of the air, and water, can not corrode, or putrifie the pure metalline part of metals, for we ſee that mercurie is not corroded, and reduced into a ſaline nature thereby, and that gold doth never ruſt, and that becauſe it is purified from all the ſaid acid ſaline principle, and is not at all corroded, but by an *aqua regia*; and ſilver contracts but little ruſt, and that according to the ſmall quantity there is in it of the ſaid Salt. And for the ſuperfluous embrionated Sulphur, that neither can be corroded by the ſaid acid ſpirit, any otherwiſe than it contains in it that eſurine Salt, for if we put pure Sulphur extracted from *Sulphur vivum* into *aqua fortis*, it will not be corroded thereby, much leſs then by the aciditie of air, and water, nay, *Theophraſtus* ſaith, that if woods, and cords be ſmeered over with an unctuous oyl, which he preſcribes to be made out of Sulphur, they will be preſerved from putrifaction for ever, though they continue in the air, water, or earth: and the truth is, nothing

can

can open and reſolve Sulphur but oyl, being of a like unctuous nature with it, as I have oftentimes tried. There muſt therefore be another corporeal Principle, *viz.* of a conſentaneous, ſuitable, and ſaline nature, that is apt for to be corroded and reſolved, and to coagulate the ſaid ſpirit.

3. Vitrial is made artificial after this manner, *viz.* Take an ounce of ſpirit of Sulphur, or vitrial, and put it into a gallon of rain-water, ſtir them well together, then put into this acid water half a pound of the filings of Iron, or Copper, and within a few hours the metal will attract the ſaid acid ſpirit to it ſelf, be diſſolved it ſelf thereby, and coagulate that. This being done decant the water, and calcine the ſaid mixture in a crucible, and being poudered, put it into rain-water ſeething hot, ſtirring them together, and then all that being ſettled to the bottom, that will ſettle, powr off the clear green water, and evaporate it, and you will have a pure Vitrial.

Like unto this is the making of Vitrial, by ſprinkling a conſiderable quantity of diſtilled Vinegar upon the pouder of Steel, or Copper, and letting of them ſtand till the mixture grow very hot by fermentation, and be again cooled, and then putting it into rain-water ſeething hot, and proceeding as in the foregoing proceſs.

Almoſt after the ſame manner is Verdigreaſe made, *viz.* by hanging plates of

Copper or Braſs over the hot vapours of Vinegar.

Now theſe three proceſſes of making artificial vitrial being ſeriouſly conſidered, will clearly illuſtrate the nativity of natural vitrial, which is as I conceive after this manner, *viz.*: by an acid ſubterraneal ſpirit (whereof there is great quantity in ſome mines) corroding the veins of Iron, or rathe Copper, which being thus reſolved, and opened are by the water that paſſeth through them, diſſolved, after which, this liquor is boyled to a Vitrial; and thus is made the Vitrial in *Danſick*, *Hungarie*, &c.

Note that any of the ſaid Vitrials, if they be made out of Copper, whether natural, or artificial, being diſtilled in a forceing furnace, yield oyle, and ſpirit, and the *Caput Mortuum* thereof diſſolved in rain water yields a pure Vitrial, and the *Colcothar* that falls to the bottom of the ſaid water, yields upon a refiners taſt moſt pure Copper like to very gold, as doth Verdigreaſe, the Metalline parts thereof being purified from their feculencies by means of the foreſaid corroſion and diſſolution.

The nativity of Vitrial being thus premiſed, it will moſt evidently appear what are the true cauſes of Spaw water, *viz.* Of their Vitrioline taſt, and odour. It will not now be a thing irrational to grant that all Spaw waters partake either of the corporeal, or ſpiritual parts of Vitrial.

They

They that partake of the ſubſtance of Vitrial are ſuch, as when they are evaporated, leave behind them a Vitriol at the bottom, and ſuch are the *Sevenir*, *Paubon*, and *Geronſter* Springs, the two former of which *Helmont* ſaid, he carefully diſtilled, and found nothing in them but the Vitrial of Iron, and like to this was a certain Spring within two miles of *Knareſborow*, the water whereof I diſtilled, and found in the bottom a Vitrial of Iron.

Moreover, betwixt theſe wells, which are impregnated with a corporeal Vitrial, there is a conſiderable difference; for ſome work upon the bowels moſtly, and by ſtool, if not ſometimes by vomit, and ſuch are they that contain in them much Vitrial, whether of Copper, Iron, or both mixed together, as *Geronſter*, and are more groſs and corpulent, and the operation of theſe is much after the ſame manner as that of ſteel, which for the moſt part doth, the firſt dayes it is taken, cauſe a nauſeouſneſs in the ſtomack, and paſſeth away by ſtool all the time it is taken, and by reaſon of the harſhnes it hath, is ſeldom attracted to, or paſſeth through the veſſels of the ſecond concoction: But they that contain little of the ſubſtance, but more of the ſpirit as doth *Sevenir*, do paſs the ſtomack, Liver, and other veſſels far ſooner, and with leſs diſturbance than do the other. And they that partake of none of the ſubſtance, but onely of the ſpiritual part, or vertues, ſuch as the Spaw-well at *Knareſborow*, of which particularly

cularly in the next Chapter, &c. are far more efficacious in many cases, especially where obstinate humours, and confirmed obstructions betwixt the stomack, and Liver, are not the causes of the distempers, for in such cases, such a Medicine must be administred, which way more strong irritate these vessels to eject those obstructing tartareous, and viscous humours, or at least dissolve and attenuate them, thereby making them to yield to more benigne purgatives.

Note also that these waters may, the more they are impregnated with the said corporeal substances, the further be carried without loss of their strength. The water of *Sevenir* is carried many miles, and into other Countreys without loss of its vertues, but that of *Paubon* much further, and into further Countreys; we have it transported into *England* very frequently. Now the water of the Spaw in *York-shire* cannot be carried near so far; but yet further than most believe, as I shall declare in the next Chapter.

Now these differences, or varieties of impregnations arise either from the difference of the quantity of the acide spirit corroding, the difference of the fruitfulness of the vein of Copper, or rather Iron corroded, or the greater or lesser continuance of the course of the water already impregnated, through veins of the said Metals, whereby it becomes long yet more impregnated, if the course be continued.

Note

Note that the veins of the ſaid impure Metals contain in them more eſurine ſalt, and yield more natural ſpirits than they themſelves when melted, and therefore communicate far more efficatious vertues than they do, I mean in many caſes.

Chap. VII.

Of the Spaw-well near Knareſ-borow.

About a mile and a half from the ſaid Town, Weſt-ward, in a mooriſh, boggie ground, (within leſs than half a mile from which there is no conſiderable aſcent) ariſeth a Spring of a Vitrioline taſt and odour, reſembling much thoſe ultramarine Spaws. The water of this Fountain ſpringeth directly up from the ſandy bottom; and this is no otherwiſe than that water doth, which paſſing through pipes in the earth (ſerving for the conveying of water, from a Fountain to a houſe or Town) doth break the pipes if they be obſtructed, or force it ſelf through them, if already broken, upwards through the ſuperficies of the earth, and flows in the manner of a Spring. For in this place the ſubterraneal veins, through which the water paſſeth, are either (if not there terminated) obſtructed, or too infirm to contain the water of the ſpring, paſſing forcibly through them, and making a vent where it can.

As for the vitrioline, and Ironiſh taſt, and odour of this water, I need (in regard I have in the preceding Chapter declared more at large the cauſes of all Spaws) ſpeak the leſs in this place. But for more particular ſatisfaction, the aforeſaid taſt and odour may be imputed, partly to thoſe vapours that proceed from the fermentation, that is in Iron, or Copper mines, and thus *Ariſtotle*, and *H. ab Heers*, would have it to be, affirming, that vapours retain the taſt and odours of their minerals, and the water with which theſe vapours are mixed become thereby impregnated, though in a more remiſs degree, with the ſame qualities: partly to the long abiding, or continuing of the water with the Iron, or Copper mine *viz.* in ſome great cavities in the midſt of the veins thereof, whereby it contracts their odour and taſt, as we ſee it doth in Iron, or Copper veſſels, if it ſtand long there, eſpecially if excited by heat, or acuated with any acidity, and as doth white wine ſtanding long with ſcales, or filings of ſteel, or iron: or partly to the water acuated with ſome ſubterraneal ſulphurious acidity, and paſſing ſwiftly through ſome hungry barren vein of Iron, which it corrodes lightly, reſolving thereby ſome of the ſpiritual, and ſubtile parts thereof onely, which it becomes it ſelf impregnated with. And hence it acquires the nature of a Spaw-well.

Now for the better underſtanding of the

nature

nature of this Spaw, I made divers experiments thereof, which are these.

1. I distilled it, supposing that if I could draw off the mineral spirits by themselves, I should discover a great secret, very advantageous for diseased people, but the water, yea, the two first spoonfuls, which were distilled, and the rest undistilled that remained, utterly lost, both the tast and odour, which they had before, neither would they become any otherwise tinged with galls than common Spring-water, although the water undistilled with the mixture of the pouder of galls, became as red as a well coloured Clartet wine. Now it is hard to conceive the true reason of this, especially since I distilled it in a glass still, and luted or closed up very carefully the joints thereof, so that spirit of wine could not evaporate out thereat. I impute it to the subtilty of those spirits, which are so volatil that they are sooner sublimed than the water it self, therefore becoming to be unbodied (for before they were incorporated with the water) and by consequence wonderfull spiritual, penetrate even the glass it self, or the lute, and I believe that neither glass or lute can hold them.

2. I took two viol glasses, and put into them a just equal quantity of the Spaw water, I put one of them into a skillet of warm water, and just took the cold off from it, than I put an equal quantity of the pouder of gals into each of those two viols, and that

water which was cold received no deeper tincture than the other as I could perceive.

3. I filled two viol glasses with this water, and stopt one of them very close with wax, and the other I stopt not at all, and at two dayes end they yielded a tincture with the pouder of gall, little less than that which is newly taken out of the well, but that less, which was left unstopt. How much it will loose this tincture by carrying far, I do not know; it were worth while to trie, and thereby to be the better assured how much of its strength is wasted, for according to the spending of its spirits the tincture sades.

4. A glass of this water stood seven dayes close stopt with wax, and than yielded a tincture with gall, like to small beer.

5. This water doth not coagulate milk as do the *German* Spaws, and another Vitrioline Spring in the same moor, which yieldeth a Vitrial of Iron upon evaporation as I said before. Now the reason of this is not because it is not a cide enough, for it is far more acid than the water of the dropping Well, which coagulates milk, if it be boiled with it, but because the acidity thereof is not permanent, or fixed enough, but so volatile as to evaporate before the milk boils.

6. This water kils Worms and Frogs, if they be put therein, and such kinde of Creatures as these.

7. It being evaporated, leaves nothing at all

of

of Vitrial behind, but onely an insipid pouder of a darkish colour, like unto which pouder will that blewish cream or skin, which swims upon the said water after long standing, be when it is dried. Now note that the aforesaid skin swimmeth upon all such Mineral waters, and as saith *H*: ab *Heers*, being put upon the fire is inflamed, and yields a sulphureous odour. It is also called by *Hadrianus Mynsicht*, *Anima vitrioli*.

8. I weighed this water, I think exactly to a grain, and it weighed neither heavier nor lighter than simple spring water.

9. It is observed generally, and I tooke especial notice of it, that it is almost an infallible signe of an ensuing rain, when glasses filled with this water continue not clear, but are covered all over as it were with a mist, contrary to what is observed in glasses full of simple common water. Now the reason of this I conceive is from the Mineral subtile spirits giving, as nitre doth, activity to the coldness of the water, whereby the glasses themselves become more cold, and so cold as eminently, and apparently to condense the humid vapours of the air, with which it abound before the rain.

To these experiments, and observations I shall add this observation also, *viz.* that this Spaw water is strongest, *viz.* with the Mineral spirits in Winters frost, by reason of the earth being the more bound up, and the said spirits being thereby kept from

perſpiration: and weakeſt in rainy wet weather by reaſon the water ſinks into the veins of the ſprings, viz. thoſe that lye neareſt to the ſuperficies of the earth, for it cannot ſink above ten feet deep though the rain be never ſo much. Alſo this water is in Summertime ſtronger in the morning than at noon, becauſe the coldneſs of the night doth ſomewhat bind the earth, and the heat of the Sun openeth the ſame, thereby making it the more eaſie for the Mineral ſpirits to evaporat out thereby.

To prevent the inconveniencies of rain, it were to be wiſhed that there were a very deep trench (yet not ſo deep as to cut a ſunder any of the veins through which the water paſſeth, if any ſhould lye within ſix, eight, or ten feet of the ſuperficies of the earth, as it is poſſible ſome may) made round the well, and bridges, made over ſome places of the ſame, for as by this means the rain would be carried away, ſo alſo the water in the boggie ground adjoyning to it, which may perhaps ſink into the veins of the ſpring, and corrupt the ſame, would be dreyned away, and the well by this means much improved, for the ground about it is ſpongious, and drinks in water apace, the uppermoſt part thereof to to the depth of a foot, conſiſting of that hollow earth of which is made pete and turfe, and that beneath it being ſandy, and alſo hollow.

CHAP.

Chap. VIII.

Of the vertues of the Spaw-well, to whom, and in what cases profitable, or hurtfull.

I Shall not stand here to reckon up all, and the several vertues of Vitrial, as not properly conducing to our present purpose, because the varities of its operations depends upon the variety of the forms, in which it is administred, or used; for the Salt thereof hath one operation, the *Colcothar* another, the corrosive spirit another, and that subtile acide penetrating spirit, (which *Theophrastus* cals his great secret, or *Arcanum* against the Epilepsie, and other such symptomes, because of its wonderfull penetrativenes leaving no part or places of the body unsearched) another, and with this hath the spirit of the Spaw water great affinity, & is therefore so much the more excellent, as being so much the nearer to it, *Primum ens* as *Helmont* calls it. Now note by the way, that although this spirit cannot be by it self extracted out of this water, yet it may be extracted out of Vitrial, yet by a very expert artist.

This water according to its first qualities cooles and moistens actually, heats, and dries potentially. And by these four qualities, the di-

distempers of the body consisting in the excess either of heat, cold, driness, or moisture, are tempered, every quality altering its contrary, and reducing it into its natural temper. And indeed it is worth taking notice of, that in such cases a distemper will rather be altered by its contrary, than increased by its like. As for exemple, if the distemper consists in heat, the heat will be allayed by the coldness of the water, and not be made more intense by the heat thereof (although the heat continue longer than the coldness, for the water is quickly warmed in the stomack, and then the potential heat is reduced into act, and continues) and so on the contrary, I mean If the water be taken regularly, and cautiously, or otherwise such happy success may not be expected.

Now according to other qualities, *viz.* second, & third, it cuts, dissolves, attenuates, abstergeth viscous, tartarous humours in the stomack, messenterie, hypochondries, reins, bladder, &c: and evacuateth them by Urine, as being indeed very diuretical, and by consequence opens the obstructions of the said parts, which are the occasions of most distempers, and diseases. It penetrates also through every narrow, occult passages of the body, where other medicines cannot come. Moreover it corroborates, astringeth, and laxateth, and divers such as these, and the former contrary operations hath it upon the body of man.

Now

Now note that although its operations are thus contrary, and the cures effected thereby, of so contrary natures, yet this is no other than what consists with, and conduceth to the preservation of nature, for if by its astriction any retention is caused, yet nothing is reteined, but what should not be evacuated, and if by its laxating, evacuation is promoted, yet nothing is evacuated that should be retained. It dries nothing but what it finds too moist, and flaccid, and so on the contrary, and it heats nothing, but what before was too cold, and so on the contrary also. I speak now as to the generality of its operating, and do not deny but there may accidently something happen contrary to general observations. But as for most exceptions that are, or can be made, either they may easily be answered, or any accidental or casual prejudice be easily prevented, and the credit of the Spaw maintained. If any shall object and say by its coldness and moisture it weakens the liver more than by its heat and driness it coroborates it, and thereby occasioneth a dropsie, where before was none, and where it finds it, increaseth it. To this I answer, *viz.* if the body be well prepared first, and the water pass freely, and other such directions and cautions observed as should be, and I have præscribed in the following chapter, it doth not onely prevent, but cure the dropsie by heating, drying, and corroborating the liver.

And if any shall object that it astringeth and bindeth the bodies of some, so much that there is no ejection of their excrements by stool for two or three dayes together, I answer, that it is true, this may happen sometimes, and it may be oftentimes by reason that those humours which should irritate the bowels to expel and eject their excrements are diverted through the ureters, by which means also the bowels become more dry, and dull, but yet this inconveniency may easily be remedied, and prevented, by taking every night at bed-time a little Cassia, or some such lenient medicament, and sometimes a glister, or suppositorie.

Many such like observations, and exceptions may be made against mine aforesaid positions, but they may as easily be answered (*salvâ adhuc famâ aquæ Spadanæ*) as made.

Now the manifold vertues, and various operations of this Spaw (as effecting cures of a contrary nature) being premised, it will I hope, be easie to conclude, what distempers, symptoms and diseases it is effectual against.

It allayes all acid, gnawing, and hot humours, and cures all such symptomes as proceed from thence, as agues, consumptions, quincies, tumours, impostumes, ulcers, wounds; it stops bleeding, the over flowing of choller, the dissentery, and such like fluxes.

It corroborates the brain, nerves &c. and prevents or cures the Apoplexie, Epilepsie, Palsie, Virtigo, inveterate head-ach, and madness,

neſs, and all ſuch ſymptoms as proceed from the weakneſs, coldneſs, heat, dryneſs, or moiſture of the ſame.

It corroborates the ſtomack, and cauſeth good digeſtion, conſumes crudities which are the cauſes of obſtructions, and breed ill bloud and infirm fleſh or an ill habit of body; it maketh the fat lean, and the lean fleſhie, cureth, and preventeth the chollick, and worms.

It ſtrengtheneth and openeth the Lungs, Liver, Spleen, meſſentery, and cureth difficulty of breathing, the Aſthma, the dropſie, melancholly and fearful, paſſions Hypochondriacal wind, and vapours (offending the head and heart,) which moſt women and many men are afflicted withall. It doth alſo upon this account cheer the heart, cure and prevent the palpitations, and paſſions thereof, as alſo all faintings.

It purifieth the bloud, cures the ſcurvy, even in thoſe whoſe teeth are ready to drop out of their heads, by reaſon of the extreamity thereof, alſo the foul veneral diſeaſe, the leproſie, Jaundiſe, yellow, and black, and for the more perfect effecting of theſe cures, it doth in many open the hemorrhoides.

It provoketh Urine, and cureth the ſuppreſſion and allayes the ſharpnes thereof, it diminiſheth the ſtone in the bladder, by diſſolving the ſoft ſuperficial part thereof, and evacuating that mucous ſlimy water in which it is involved, and by this means alſo it pre-

pares it for cutting, for sometimes this stone cannot be felt, by reason of that slimy mucus, which mucuus it self doth also sometimes by its torments counterfeit the stone, where it is collected in a great quantity, being of an acid tartarous nature. It forceth out from the kidnies, and bladder abundance of sand, and small stones to a great number, and sometimes such as are as big and as long, as long pepper. And as it cures all ulcers, and wounds in the body, so especially and much sooner in the reins, and bladder, suppressing also the pissing of bloud, and the gonorrhea.

It cures the Gout, Aches, Cramp, convulsion in what part of the body whatsoever, and giveth great ease therein suddenly.

It openeth all obstructions, and suppresseth all manner of over-flowings in Women, strengtheneth the womb, cureth the mother, maketh the barren fruitfull, and is a great preventative against miscarryings, and rectifies most infirmities of the womb.

Note that this water doth not help all parts, cure all these infirmities after one, and the same manner; for some part of the body, it helps *per se*, as we call it, and some *per accidens*: *per se*, it helps those, through which it passeth and toucheth, and that either by its crass substance, as the Mouth, Jaws, Stomack, Messentery, Liver, Reins, Bladder, *&c.* or by its Spiritual parts, which do penetrate the whole body. *Per accidens* it helps those which

are

are diſtempered by conſent, or by the obſtructions of other parts, and this by removing the obſtructions thereof.

It is alſo uſed by way of inſeſſion in griefs of the womb, and by way of injection, into that as alſo into the bowels & bladder, where all the qualities act immediatly upon thoſe parts, allay the ſharp, and hot diſtempers, mitigate the pains thereof, healing and corroborating the ſame.

It may moreover be uſed by way of fomentation, and lotion in external wounds, Ulcers, Itch, or Scabs, and being dropt into ſoar eyes wonderfully cooleth, drieth, and cleareth the ſame.

In a word, if any intenſions in a medicinal way, be to be performed by allaying diſtempers, opening, obſtructions, evacuating, ſuperfluous morbifick humours, and corroborating all the parts of the body, thoſe are effected in a very good meaſure, if not fully and perfectly by this water. And I my ſelf have ſeen many of the aforenamed diſeaſes cured by the help thereof, and for other cures effected thereby, I have been aſſured by them themſelves who received the benefit, or by others who have been eye witneſſes of the ſame.

Some may demand whether this water may be adminiſtred to Children, Old, Men, and Women great with child.

Sol. 1. As to the firſt, although the heat of children be ſoon deſtroyed by cold, yet

this water may ſafely be given to children of a year old, if the water which they drink exceed not the ſtrength of their ſtomack, or if their ſtomack can bear it. And *H. ab Heers* ſaith, he ſaw a ſucking child drink of the *German* Spaw with good ſucceſs, and ſome children very young have taken of ours, not without benefit.

2. As to the ſecond, It is true that their heat alſo is very little, and ſoon extinguiſhed by cold, yet if the ſtrength of their ſtomacks be able to carry it off, without a manifeſt dejection of the appetite, it may ſafely to them alſo, but not in ſo large a quantity as to others, be adminiſtred.

3. And as to third, It is true it is diuretical, and may ſeem dangerous for them to take it, yet it hath been obſerved, that many have taken it ſecurely enough, ſome when they have been very young with child, and others, when near the time of their bringing forth. I ſhall not give too much liberty, neither ſhall I lay too great a reſtraint upon them, Onely I ſay, it is ſafeſt for them to take it in the fourth, fifth, and ſixth moneth, and *Hippocrates* himſelf will admit of purgation, at that time. But if any be very deſirous to take it before, or after by reaſon of ſome griefs urging them thereto, let them uſe it cautiouſly and in leſs quantity, and withall take ſomething every night to prevent the inconveniencies thereof, as Pearl, Corall, pouder of hartſhorn, or the like.

℣ Q. It may be demanded, whence it is that the excrements upon the taking of this water become black.

Sol. This blackneſs is not from the mixture of black melancholy humours as many will have it, for if the ſoundeſt healthieſt body in the world, who can in no wiſe be ſuſpected to have any aduſt black choller in him his excremẽts will alſo be tinged black therewith. Beſides, we do not find that one mans body in twenty, that are diſſected, have any ſuch black humours in it, nay, although he were the moſt melancholly man in the World, & therefore to impute it to a mixture of this, is a great errour. Neither do I impute it to Iron onely, as *H. ab Heers*, who, becauſe Iron did the like, would not aſcribe it to any thing elſe. But it ſeems he had not, as it appears by his own words, obſerved that Vitrial would do the like, and that either of Iron, or Copper, and that although Iron being taken inwardly, the excrements are tinged black, it was by the Vitrial which was made in the body by the acid ſpirits thereof, reſolving the eſurine Salt of the Iron, and corroding it into a Copperas, he, I do ſuppoſe, never conſidered, and the reaſon he gives to prove, that Vitrial doth not diſcolour the excrements, is, becauſe oyl, or ſpirit of Vitrial will not. But herein he argues a *conjunctis ad disjuncta*, and therefore his argument is of no force. For here is but a part of the Vitrial, *viz.* one part abſtracted from the other, and that not with-

without the deſtruction of the ſpecies. Now if the ſpecies could be conſerved it might be done, although it were volatile and more ſpiritual as the Vitrial is in this Spaw; for the truth is the ſame ſpecies may be fixed, and yet become volatile, and more ſpiritual, and yet all this while the ſpecies be conſerved.

Note here by the way, upon what account it is that Iron, or Steel opens obſtructions; and it is this, *viz.* There being a great affinity betwixt the eſurine Salt in Iron, and all acid unſpecificated ſpirits, the acid ſpirits in the body which are the cauſe of fermentation and coagulation, and by conſequence of obſtructions, do preſently forſake thoſe parts, and humours where they are ſeated, and betake themſelves to the Iron, which they endeavour to diſſolve, and ſo be united to the aforeſaid Salt that is in it, (to which union they have a natural propenſity) and ſo being therewith united, are with the ſame ejected, together with the obſtructive humours, which at the ſame time are ejected, *viz.* when nature is ſtrongly irritated to expel the Iron, as being very offenſive to her.

CHAP.

Chap. IX.

Of ſome general directions to be obſerved before, in the time of, and after the taking of the Waters.

THere are ſeldom any diſtempers, or diſeaſes that occaſion people to go to the Spaw, that are without peccant, excrementitious, obſtructing humours, which muſt of neceſſity be removed before the drinking of the waters attempted: and that either becauſe thoſe crude, groſs humours in the greater veſſels will be by the force of the waters carried down into the narrower paſſages, and there cauſe greater obſtructions, and by conſequence Feavers, Dropſies, Gripings, *&c.* and alſo hinder the free paſſage of the waters, to the endangering of many unthought of inconveniences, and ſymptomes; as alſo becauſe nature, being thereby disburdened of the load of groſſer humours, will be the better able with the aſſiſtance of the waters to overcome, digeſt, and evacuate the thinner, and thoſe that are left behind, and the ſooner recover its natural vigour, and ſanitude.

Now for the Medicines to be adminiſtred, they muſt be elected ſuitable to the humour offending, and proportioned to the ſtrength

and constitution of the patient. I do in most cases very much approve of vomits, because they do effectually cleanse the stomack, and the *primas viæ*, and instead of them, where they cannot be safely, and conveniently used, *hiera picra* comes next in place for absterging, and cleansing the stomack, bowels, messentery, and making free passage for the water to pass to the Liver. And after either of these, some proper lenitive for the opening the passages through the Liver, Ureters, Kidnies and into the Bladder.

Phlebotomy also, or letting of bloud is in many cases to be considered of, *viz.* if the veins and other adjacent vessels be oppressed with bloud, or any peccant humours, for thereby they will be made more fit for the waters to pass through them, and the virtues thereof into them.

Also in case of very obstinate obstructions, I advise that a chalybiate course of Physick be run through for a certain time, that thereby the waters may with the less resistance act their parts, and sooner, easier, and more perfectly effect the intended cures.

Now after such preparation is made, and the patient come to the Spaw, let him also then take some easie vomit, as of Oxymel, or wine of Squils, or the like, or some *hiera picra*, the first day after he is come thither, and the next morning after that some Lenitive, as Lenitive Electuary, Cassia, Manna, Tamarines, infusion of Sene, Rhabarb, syrop of Roses,

Roſes, or the like, according to the humour that is to be evacuated, and then let him cheerfully, and confidently begin to drink theſe waters with a reſolvedneſs to obſerve all ſuch rational directions, as he ſhall find in this, and the next enſuing Chapters preſcribed. But for poor people, or they that loath all that bears the name of Phyſick, drink three or four mornings of the Sulphur-well, for that will in a good meaſure effect the ſame.

When any one is reſolved for the Spaw, let him then firſt apply himſelf to ſome experienced Phyſitian, who ſhall be able to underſtand his conſtitution, diſtemper, and the nature, and uſe of the waters themſelves, that accordingly, as cauſe ſhall require, the more ſucceſsfull preparatives may be adminiſtred, and the more effectual directions given. This I adviſe the rather, becauſe there be divers Phyſitians in the Nation, who never ſaw, taſted, ſcarce read of the waters, or converſed with thoſe that know them, yet ſend their patients, ſuch as they account incurable, and deſperate, thither, giving them ſuch directions for the drinking the waters as the very Spaw-women themſelves laugh at.

A due preparation being premiſed, let him that drinks the waters begin with four, or five, or ſix half pint glaſſes, more or leſs as his ſtomack can well bear, and ſo by degrees proceed to two or three glaſſes more every day until he come to the height, and his full doſe, which will be when he

can take no more, without a manifeſt oppreſſion and nauſeouſneſs. Some will drink twenty, ſome thirty of theſe glaſſes in a morning, and ſome can not take half ſo many.

In the morning before the water be drunk, let firſt all excrements be evacuated, either by nature, or art, as by glyſters, ſuppoſitories, or ſome pills, or lenitive taken the night before at bed-time; for the retaining of the excrements hinders the concoction of the waters (if I may call it a concoction) and by conſequence their paſſage through the body, whereby are cauſed preſſures, fluctuations, tenſions, gripings, and ſometimes cold ſweat.

Betwixt every two, or three, or four, or five glaſſes, let ſome exerciſe be uſed, of which more largely in the Chapter of exerciſe. And for the better paſſing of the waters, comforting the ſtomack, and preventing of nauſeouſneſs, let ſome good cordial, ſtomachical ſpices, ſeeds, and roots, be taken betwixt while, as Anniſeed, Caryoway and Coriander confects, Citron, or Lymon pilled candied, or dried, Pepper loſſenges, Cardamums, but above all I prefer Elecampany root candied, or for want thereof Angelica root, or ſeeds, for they, eſpecially Elecampany, as the Lord *Viralam* ſaith, breed a robuſt heat, and I am ſure promote the paſſage of the water moſt eminently, and comfort all the veſſels through which the water paſſeth, and withall make the water more effectual for the o-

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pening of obſtructions, and corroborating infirm parts.

I approve not of taking the waters too faſt, or alloting too ſhort a time for the drinking of the full doſe, or proportion. I conceive that for the generality it will be moſt convenient for to take at firſt a quarter of the proportion, and then exerciſe half an hour, and then another quarter, and exerciſe till the water begins to be evacuated, and then a third quarter, with exerciſe half an hour more, and then the laſt part with exerciſe, till it be all paſſed out of the body. But if any cannot bear the drinking of a fourth part at a time, then let them take the eighth part, with a quarter of an hours exerciſe betwixt every while. To drink the waters too faſt cauſeth for the moſt part nauſeouſnes, oppreſſeth the natural heat, and compreſſeth the paſſages and veſſels, that the water cannot paſs ſo freely through them as otherwiſe it would do, and alſo cauſeth divers ſymptoms, as tenſions, gripings, cold ſweats, dejection of appetite, and the like. If a great quantity of water be caſt upon a fire at once it extinguiſheth it, but if by degrees, it maketh it burn the more furiouſly, and intends the flame thereof. *Ryetius* is therefore in my judgement very erroneous, as to this point, who would have the whole proportion be taken in half an hours time.

The time for the continuing the taking of the waters muſt be proportioned according to the greatneſs of the diſeaſe, and profit

received by it. In case any one after a due preparation, and upon a carefull observation of such directions as are required, shall not be able to bear the waters, and drink them without a manifest and eminent oppression, and nauseousness after several assayes, let him cease presently from the taking of them: but if upon the taking of them, he can take them without any such inconveniency as should cause him to desist, & yet perceive no benefit thereby; let him not presently give over the use of them, as despairing of any further benefit, but continue the use of them a moneth, or two, or longer, if the disease require it. In *Germany* they drink of the Spaw, not onely a quarter of a year together, but sometimes half a year, and sometimes a whole year if it be requisite, and at last they receive the benefit thereof, by being cured of most desperate diseases, which otherwise were in the vulgar account incureable. It is a great errour amongst us *English*, to allot but two or three weeks time, or a moneth at the most, for the taking of the Spaw, let the disease be what it will, and hence it is, that many miss of those happy cures, which by a longer continuance might have been effected, and this to the prolonging of their own misery, and defamation of the Spaw it self.

I do admit of the use of purging Physick, to be taken every eight, or tenth day, for the evacuating of crudities, which for the most

part

part are bred in that time, & also some grosser humour loosened by the water, or those which become crass, or thick by the waters themselves, carrying away the thinner part first; for these remaining in the body, would else be carried down into the smaller vessels, and cause obstructions, and thereby many other great inconveniences and symptomes, retarding also, if not utterly preventing the intended cure. Now the Medicaments I approve of most in these cases, are *Hiera picra simplex Galeni*, Rhabarb with Crystal of Tartar, and such like, to be taken one, or two dayes together, as there shall be occasion, and some Lenitive, as Cassia, or Lenitive electuary, or the like to be taken the next day after that, for the moistning of the bowels, and the better preparing the passages betwixt the stomack, and bladder, against the next repeating the use of the waters, which I advise may begin the next morning after. And in some cases Physick may be taken every day, nay, mixt with the waters themselves, as in *Germany*.

Now I know it is a common, though absurd opinion, that Physick is very prejudicial to those that take it, whilest they are in a course of drinking the waters, and therefore is most irrationally decried. Now the chief ground of this errour, as far as I ever could understand is this, *viz.* Some certain years since, some famous Doctors attending upon persons of great quality, their patients,

to

to the Spaw, did prescribe them the use of some Physick, with the waters, and it succeeded ill. This might be true, but what then? Might not those Physitians, though otherwise knowing enough, be ignorant of the right use of the waters themselves, and of the preparations requisit for the taking of them with success? Or might not they be willing to bring the Spaw out of credit, because it might happily cure their patients too soon, and thereby be prejudicial to them? Or might not their patients be unwilling to drink the water regulary; or disorder themselves in respect of diet, exercise and the like? Now whether either of these, or all these might be the cause of the aforesaid unsuccesfulnes, I cannot determine, onely this I know, that the use of Physick is not onely not unsafe, but very necessary in the use of the waters, nay, and in many cases to be mixed with the waters themselves, as in the next Chapter I shall more particularly give you to understand.

Three or four dayes before giving over the waters, they must be abated by degrees, as at the beginning increased by degrees.

After the ending of the waters, immediatly, even before you return from thence, some such purging Physick will be necessary as may evacuate all the water that shall remain secretly in the body, as oftentimes it doth, and withall comfort and strengthen the stomack, and Liver, and moisten the bowels if there

there be any feaver, of too great attrition of body afterwards. Also a very spare diet will be very necessary for a moneth after, for by this means nature will become master of the bodily infirmities, all crudities being removed, and prevented.

Chap. X.

Of particular directions, and cautions in particular cases, and of preventing and curing such accidents and symptomes, which sometimes happen in the taking of the waters.

They that have a very good digestion may in the afternoon about five, or six hours after dinner, take half the quantity which they did in the morning, but with this caution, that they eat a very light supper after it; and as for those that have a very bad concoction, let them altogether forbear it in the afternoon, or at most drink but a glass for the diluting, and better distributing of the chylus, if already perfected.

If any shall drink of the water for the curing of an ague, let them so observe the time for the taking of it, that it may be all passed through them before the coming of the fit, because otherwise nature will be di-

ſtracted in her motions, *viz.* evacuating the water by Urine, and the morbifick humour by ſweat. And as for thoſe that have a continual feaver, let them forbear it altogether, unleſs the humours be concocted and fit for evacution, either by ſweat or Urine, as I have more at large declared in the fourth Chapter, concerning the taking of cold water inwardly, in caſe of a feaver.

My adviſe is that they that have very weak and cold ſtomacks, ſhould take the water a little warm'd firſt (i.e.) the cold being juſt taken off. The truth is, the coldneſs of the waters doth very little good at all, unleſs it be to allay a very great heat, and drought. So great a quantity thereof as is uſually taken cold, muſt of neceſſity diminiſh the natural heat in cold conſtitutions. A glaſs of cold water caſt upon a fire, though but ſmall, may make it burn the more ſtrongly, but if ten, or twenty be caſt upon it, they, if they do not quite extinguiſh it, yet will ſo far check it, that it will a long time labour under the deſtructive contrariety thereof. And actual heat is far more ſuitable to nature, & if ſo be the vertue of the water is not diminiſhed thereby, (as it is not, as I have demonſtrated by the ſecond experiment in the foregoing Chapter) far more effectual, the potential heat thereof being ſooner reduced into act without any checking, or oppreſſing the natural heat. The ſtomack being a nervous part, and of exquiſite ſenſe, muſt needs be offended

fended with that, which is actually cold. This made the ancient *Grecians* and *Romans* drink moſt of their water, and wine hot, as we find in *Salmuths* collections. The *Lord Virulam* wonders that *calidum bibere* is ſo much grown out of uſe. If to drink an ordinary quantity of drink cold, were not approved of by the Ancients, with what face ſhall I commend the taking of gallons of cold water every morning for certain weeks together? I do therefore ſeriouſly adviſe thoſe that have cold and effeminate ſtomacks to take off the cold from the water before they drink it.

If upon the taking of the water, it paſs not through the body freely, but is retained, it is to be conſidered in what place of the body it is at a ſtand, that accordingly ſome appropriated means may be adminiſtred for the evacuation of it. For if it be retained in the belly, or hypochondries (which will appear by its rumbling, wind, tenſion, oppreſſure) a glyſter will evacuate it; if in the ſtomack, which appears by a diſpoſition to vomit, *hiera picra*, or *Rhabarb* will be convenient for the opening, and cleanſing thereof and making free paſſage for it from thence. If it be retained in the habit of the body and veins, which appears by oppreſſure, and a chilneſs over the body, without the aforeſaid rumbling, tenſion, wind, *&c.* I approve of *hiera picra*, with *Jollap*, *Mechoacan*, or the like hydragogal medicaments.

They, that when they have taken the waters, cannot evacuate them for want of exercise, as being to feeble to stir much, or walk, and not having the conveniencies of horses, may either drink all their proportion of water in the bed, or take some part at the Well, and then go to bed, and there take the residue. I have oftentimes observed that the water would freely pass through many, when they were in bed, but would not otherwise, and the reason of it was as I conceived, because the passages of their body were contracted by going into the air, but more open by the warm'th of the bed.

Now for the rendering the water more effectual, it will be necessary, as is the course in *Italy*, to make use of some specificks with the drinking of it. *H. ab Heers*, allowes of the decoction of Sanicle, Pimpernel, Scabions, *&c.* to be drunk in case of spitting of bloud, inward Impostumes, Ulcers, Wounds, and Infirmities of the breast, and Lungs, the benefit whereof he experienced by many years practise. And why may not we do the like in several cases, as to allow of a spoonfull, or two, of the juyce of Saxifrage, or the like to be taken in the first glass, in case of the stone, or gravel, or to take Turpentine pills, or a bole with Turpentine and Cassia the night before, and in case of very great obstructions, dropsie, and cold moist stomacks, or the like, to mix some Sugar of steel, or steel wine with the first glass? But note that in such cases,

they

they are to be taken half an hour, or a whole hour, before the taking of any more of the water.

For the better passing of the waters, let the first glass be mixed with Sugar, Syrrup of Liquorish, or *de quinque Radicibus*, or Nitre, or Spirit of Salt, or Vitrial, Salt of Tartar, or a glass of white wine, in the midst of the water, or mixed with three, or four of the first glasses, or two or three glasses of the Sulphur Well in the midst of the Spaw-water, or a good draught of the decoction of Fennel, or Parsley-roots, be taken half an hour before the water. Note that some of the aforesaid things are penetrative and so force their way, and some are sweet, and therefore are sooner attracted to, and by the Liver, and so the more speedily evacuated.

In case of the necessity of any of the aforesaid mixtures, it will be convenient and necessary, that some experienced Physitian be first consulted withall. And if you meet with none at the Spaw, that you can confide in, *York*, and other places are not far, where you shall find such Gentlemen that are able to advise you, as concerning this, so also in any other case, and especially if any unexpected accident should fall out whilest you are drinking the waters.

In case in the taking of the waters, fumes, and vapours fly to the head as oftentimes they do, even to inebriation, let none be disheartned thereat, for either they are the spirits of

the water themſelves alone, which will do the head much good, or elſe there is a mixture of wind from the ſtomack; for when that is filled with water, the wind that was in it muſt of neceſſitie be forced up to the head, but there it continues but a very ſhort time.

And as there is no neceſſity of preventing it, ſo neither can it be well prevented: but yet for ſome ſatisfaction, let Nutmeg, and Coriander ſeed, being beaten together into a groſs pouder, be taken after every fourth part of the water; for the gratefull vapour thereof will alſo be carried up to the head, with the force of the other vapours from the ſtomack, and withall ſomewhat corroborat, and cloſe the mouth of the ſtomack.

Q. It may be demanded whether or no the rednes, and hot pimples of the face may be cured by the inward uſe of this water, and it is the more queſtioned, becauſe it dries, and heats the Liver.

Sol. It is true, that for the moſt part the rednes of the face is increaſed by the uſe of this water, but yet notwithſtanding, it may in a great meaſure be cured with the help thereof, with the obſerving of certain rules, and cautious which do much conduce thereunto. The patient that is thus affected (his body being well prepared by medicaments, & phlebotomie,) muſt in the firſt place drink of this water, ten or twelve mornings together, for by this time it will in ſome conſiderable

derable measure remove those obstructions of the messentery, & Liver which are the chiefest cause of the aforesaid distemper, then let him be purged with some cooling lenitive, and then because the continual use of the water should not, as doth steel, heat the bloud too much, or rather by its strengthning the inward parts, drive outwardly the heated corrupt humours of the body too fast, I advise that he do for seven, or eight dayes together drink clarified whey, made with cooling, moist, and diuretical herbs and medicaments, as Borage, Lettuce, Seangreen, Endive, Grass-roots, Parsly, and Fennel-roots, Nitre, Tamarines, Liquorish, and such like, and withall have a vein breathed, if nothing contradict it, and then return again to the use of the water for another fortnight, and after that again to cooling purges and the cooling, and clarified whey, as before, for a moneths time. Note that withall, that some topical Medicines are to be applied to the place affected, as oyl of the yelks of Eggs, oyl of Tartar, juice of Lemmon and Salt, *unguentum album*, but above all *flores sulphuris* dissolved in oyl, or the like. By such kind of means with the use of the Spaw-water, I would undertake to cure almost any red *pimpled face whatsoever.*

CHAP.

Chap. XI.

Of the neceſsity, and manner of exerciſe, in the uſe of the waters.

EXercise is, whileſt the water is in the body, very neceſſary, as being good to laxate the paſſages of the body, to excite the natural heat, for the better digeſtion of the waters (if as I ſaid before, we may properly call it a digeſtion) for by this means, ſaith *Archigenes*, as alſo *Aetius*, the internal veſſels being heated will more ſtrongly attract, and expell. Some kind of exerciſe is, if ſtrength permit, to be continued from the firſt glaſs to the evacuation of the whole proportion taken.

Now for exerciſe in particular, riding on a trotting horſe, or in a Coach are the beſt, becauſe thereby the muſcles of the *abdomen* being preſſed, do intend the expulſive faculty of the Ureters and bladder. And where thoſe cannot conveniently be had, and uſed, I commend walking, bowling, pitching of the bar, and leaping, and the like, all which muſt be uſed ſo moderatly, as not to provoke ſweat, for by ſweat the water will be drawn into the habit of the body, to the endangering of a dropſy and ſuch like ſymptomes. They that are not able to walk, nor have the accommodation for riding, muſt take the waters

waters in their bed, for the warmeth of the bed doth as I said before, serve very well instead of exercise, and answers to the intensions thereof.

Sleep is very hurtfull, because in sleep all excretions, or evacuations of excrementitly except sweat, which is thereby promoted, and for the aforesaid reasons to be prevented, are suppressed.

Sitting on the ground is hurtfull, and also standing in the Sun, and walking late in the evening.

Chap. XII.

Of the time of the year, and day when the Spaw is chiefly to be taken.

IN frosty weather the water is strongest, because the mineral spirits thereof are by the binding of the earth suppressed and prevented from evaporating through the superficies thereof (as they do at other times) by which means the water becomes the more strongly impregnated therewith. But by reason of the inconveniency of journying, and of the uncertainty of the frost, I prefer the Summer, *viz*, from the beginning of *May* to the end of *September*, and before and after, if the season be dry.

Ob. Some may object against the use of the Spaw in the Canicular, or Dog dayes, because, say they, *Hippocrates* in the fifth of his

fourth book of *Aphoriſmes*, ſaith, Τὰ φυόμενα, καὶ πρὸ κυνὸς ἐξαγώγεες αἱ φαρμακεῖαι. forbiding thereby purgations, and evacuations, and theſe being forbidden, ſay they, how ſhall we prepare our bodies for the taking of the waters?

Sol. This aphoriſme having been theſe many years groſly miſtaken, hath been the occaſion of the deaths of thouſands, I ſay miſtaken, becauſe purgations are not here at all forbidden, but onely intimation given, that in that ſeaſon, by reaſon of that uſual extremity of heat, the humours being drawn outwardly towards the habit of the body are not ſo eaſily retracted, and evacuated by way of purgation, as being more remote from the medicament, and alſo in a contrary motion. Beſides, who is ignorant of the great difference betwixt the climate *Hippocrates* lived in, and ours, as alſo betwixt his medicine and ours, which are both far milder and temperate than his? And who doth not know (being the ſame alſo which, *Heurnius* ſaith of the ſeaſons of his Countrey) that *May* & *June* prove oftentimes far hotter moneths then *July* and *Auguſt*? It is needles to enter upon any long confutation of the Vulgar opinion, which is weakly grounded upon the ſaid aphoriſm, and hath a long time been abſurdly maintained, and the rather, becauſe it begins to be generally exploded: And indeed, it is good for men to grow wiſe by others harms.

In

In extream wet weather the water becomes far weaker than before, and the reason is, becauſe the rain, although it doth not uſually ſink above ten feet deep yet may into ſome of the veins of the ſaid ſpring, which lye towards the ſuperficies of the earth. In ſuch a ſeaſon the water may beſt be omitted, (as having but little, or no ſtrength in; at moſt, not enough to qualify the coldnes, and moiſture thereof) unleſs it be corrected and amended with Sugar of Iron, made out of the very Mine of Iron, or with ſpirit of Vitrial, for want of the other.

The fitteſt time in the morning, is betwixt ſix and ſeven of the clock, for thoſe that be of a ſtrong digeſtion. But as for thoſe that are very ſick with a nauſeouſneſs in their ſtomacks, in caſe they riſe early; I adviſe that they lye longer in their bed, and ſleep for the better digeſtion of thoſe crudities, for otherwiſe they will be carried down with the water into the narrower paſſages, and cauſe great obſtructions, and the water thereby become more impaſſible.

As for the taking of the waters in the afternoon, I have occaſionally declared my judgement with the reaſons thereof, in the tenth Chapter, *page* 89.

Chap. XIII.

Of the Dyet to be observed by Spaw-drinkers.

THe greatest reason why many receive but little benefit, and some none by the Spaw, is because of their intemperancy in respect of dyet. This water for the most part begetteth a very great appetite, by reason whereof many forget themselves at Table, putting in more than nature can dispose of, and hence are crudities, the nursery of all diseases; And it is true what *Galen* saith, affirming, that no man shall be vexed with sicknes that is not oppressed with crudities. And whence crudities, saith *Hippocrates*, but from fulnes, affirming also, that to eat without fulnes is the rule of health? He also saith, that what diseases so ever are cured by evacuation, are caused by repletion: and do not we see that all diseases are cured by evacuation, *viz.* vomiting, purging, bleeding, sweat, and urine? When the Chylus is ill concocted, or rather corrupted (for *Aristotle* calls it μόλυνσις, not πέψις, corruption, not concoction) it passeth crude through the whole body, for the second concoction doth not amend the first, nor the third the second, so that hence of necessity great obstructions, the occasion of tensions, gripings, all manner of hypochon-

driacal

driacal diſtempers, ſtone, gravel, diſtemper of the head, heart, liver, ſtomack, bowels, limbs, and indeed of all parts. There is an *Italian* Proverb, that he that will eat much, muſt eat little, that is, by eating little he ſhall live long and ſo eat much. A ſober dyet, as it prevents, ſo alſo cures many infirmities, and diſtempers by diminiſhing crudities already bred, and reducing all the humours of the body to the government of nature.

Let ſuch dyet be uſed, as may not hinder the effects of the Spaw, being of a good laudable nouriſhment, of eaſie digeſtion, and may freely paſs through the veſſels, ſerving for the diſtribution thereof. Let not the meat be dreſſed, or ſauced deliciouſly, ſo as to prolong appetite, beyond the ſatisfaction of natural hunger, and thirſt, thereby cauſing a greater quantity to be taken in, than otherwiſe would, or nature requires, or can digeſt. For the moſt part meat offends more by its quantity than quality.

In more particular manner I forbid all fleſh that is very ſalt, and fat, Bacon, Pork, Neats-feet, Tripes, tame Ducks, Geeſe, gizards of Poultry, all ſalt Fiſh, Eels, and all things that come from milk (except Butter, Whey, Milk, Pottage, Cheeſ-curds) alſo Leeks, Onions, Parſnips, Cabbage, Muskmillions, Cucumbers.

Helmont forbids nothing, onely exceſs, ſaying, that Nature hates curioſities.

I could reckon up divers other things that I ſhould forbid, but becauſe they are never

uſed at the Spaw, it will be needles to mention them.

I diſapptove not of Beef, if it hath been ſalted but a week, eſpecially for thoſe that love it.

I allow for thoſe whoſe bloud, and Livers are hot, Pears, Apples, Plums, Cherries, Raſp-berries, ripe Gooſe-berries and raw Sallets, but with this caution, that they be eaten a little before ſupper, and alſo ſparingly, and one glaſs of white wine drank after them, for they do temper the bloud, and promote the curing of the diſtemper thereof.

I forbid much variety of meats, becauſe of the unequalneſs of their concoction, and becauſe nature is (although the pallate be not) beſt ſatisfied with ſimplicity of dyet. And excellently doth *Macrobius* diſcuſs this point.

As for drinks, I commend beer, or ale, that is neither too ſmall, or too new. They, whoſe ſtomacks are very cold, may drink Beer, or Ale as ſtrong as can be made, and alſo a glaſs, or two of Sack with a toſt put into it, which they may eat; and theſe do much further, and help concoction.

I approve of the drinking of pure, thin, well refined white and Rheniſh wine, but not at meals, unleſs in a very little quantity, becauſe they are very diuretical, and penetrative, carrying down with them to the Liver, and through the narrow veſſels, the crude juyce of the meat, before it be concocted, thereby

thereby endangering obſtructions; but let them be drunk a little before ſupper.

The time of eating muſt be conſidered according to the paſſing of the water through the body, for when the Urine begins to change its colour, paſſing from white to a higher colour, then is it a ſign that the water is paſſed through, and then ſomething may be eaten and not before, unleſs when good part of the water, although not all, hath paſſed through freely, and then ceaſed for an hour, or two, and then alſo it is time to eat ſomething, for it may be that nature hath diſpoſed of the reſidue that is left behind, & retained, for ſome other uſes, as to moiſten ſome dry parts of the body, or the like.

They that are firſt ready to eat, may ſtay their ſtomacks as we call it, with a meſs of broth, which commonly is there made very good, and then have ſo much good fellowſhip and civility to wait for their dinners till all the good company of the houſe be ready for the ſame.

Let the ſupper be larger, than the dinner, becauſe in the evening the ſtomack is leſs laxated, and languid, than at noon, and can therefore concoct a greater quantity of meat. Yet the ſupper muſt not be very large, neither greater than what the ſtomack can be well able perfectly to concoct before the next morning. Let it be ready at ſix at leaſt, if not ſeven hours after dinner.

I adviſe that all, whether it be at dinner, or ſup-

ſupper, that they leave with an appetite, & eat not half ſo much as the Spaw drinkers uſually do, indulging their pallates, and gratifying their ſtomacks according to the meaſure of their appetites, which many times is rather adventious, or preternatural, then natural.

I utterly diſapprove of mixing of the Spaw water, with either Wine, or Beer, but yet I allow of the drinking of a glaſs of it ſelf at bed time, for the corroborating and cloſing of the mouth of the ſtomack, and ſuppreſſing of vapours, which would otherwiſe diſturb the brain from quiet ſleep.

Chap. XIV.

Of the Sulphur-well.

THis is called the Sulphur-well; by reaſon of its Sulphurious odour, although beſides this, it hath two other qualities, *viz.* ſaltneſs, and bitterneſs. I ſhall in the firſt place endeavour to prove, whence it contract its ſaltneſs, and thereby I ſhall the better make to appear the cauſe of it ſtanch and bitterneſs. Now, becauſe the Salt, which this water yields upon evaporation, is of the ſame nature with, & cannot be diſtinguiſhed either in odour, or taſt (the ſtanch being loſt in the evaporation) from common black Sea-ſalt, I ſhall firſt declare what is the cauſe of the ſaltneſs of the Sea, which is no other than that

that of this water. And first I shall shew what is not the cause of it, thereby confuting the opinion of many ancient Philosophers, and their followers.

1. The saltness of the Sea, is not caused by the Suns exhaling the sweeter parts out of it, as was the opinion of *Aristotle*; for this supposeth that there was the same saltness in the Sea before, but was not, but upon this account manifested, but this can not be, for then, why are not other waters, as Rivers, Ponds, Lakes, *&c.* made saltish also by the Suns exhaling their sweeter vapours.

2. The Sun doth not boil into the Sea, by the vehemency of its heat, that saline tast, according to *Pliny* being almost of the aforesaid opinion, for then, why doth not the Sun work the same effect, upon a Pond, or Vessel of water, on which it may work more vigorously, by heating more vehemently, *viz.* (because it is less resisted, by reason of the small quantity of water in them) than on the Ocean?

3. This saltnes is not caused (as *Scaliger* would have it,) by rain, mixt with hot, dry, and terrene exhalations; for the rain it self would also then be saltish, which indeed is most sweet, and if it were saltish, then why are not Pits, Rivers, *&c.* which are many times filled with Rain-water, saltish also?

Now the weakness of these opinions, *viz.* (the chiefest that have usually been embraced) being detected, I shall shew from whence

very probably this ſaltneſs of the Sea may proceed. We muſt therefore in the firſt place conſider that the Sea is not ſimply ſaltiſh, but ſaltiſh and bitter together, that is, it hath a taſt made up of bitterneſs, and ſaltneſs: for which cauſe, as ſaith, our learned Countreyman, M^r. *Lydyat*, in his *diſquiſitio Phyſiologica de origine fontium*, Chap. 9. *de ſalſedine maris*, the Latines gave theſe two names to it, *viz.* *Mare, quaſi amarum*, & *Salum, quaſi ſalſum*. And this *Ariſtotle* himſelf conſents to, giving the reaſon of thoſe two taſts in general, and of them in the Sea in particular, where he ſaith, that all kinds of taſts ariſe from a kind of terreneſs more, or leſs aduſt; but bitterneſs from a terreneſs, very much elaborated by a fiery heat in the burning bowels of the earth; and ſaltneſs, where that heat is ſomewhat remitted. If ſo, then let us conſider whether there be not abundance of terrene aduſtneſs in the bowels of the earth, and gulfs of the Sea where a bituminous fire is alwayes burning, being fed by water (as I declared more at large in the 2. Chap. *viz.* *Of the original of Springs in general*) and that whether we may not probably conclude, and eſpecially becauſe bitumen is bitter, and very full of Salt, that the burning of the bitumen together with the terreneſs therewith mixed in the gulfs of the Sea be not the cauſe of the ſaltneſs thereof. Moreover, that bitumen hath a great power to communicate to, and beget a bitter, and ſaltiſh taſt in water, is confirmed, by that

which

which Geographers write concerning the Lake of *Paleſtina*, which is called in Greek Ασφαλίτης, i. e. bituminous. For ſay they, the Lake is ſo bitter, and ſaltiſh, that no fiſhes can live therein, and it is called in ſacred writ the ſalt ſea κατ' ἐξοχήν. And Hiſtorians ſay of it, that if a man be caſt into it bound hand and foot, he cannot be drown'd; and the reaſon of this is the ſaltneſs thereof, for we ſee that waters bear the greater burdens, by how much the ſalter they are, witneſs the difference betwixt the Sea, and freſh Rivers, and our boiling of brine till an Egg ſwim thereon, and will not ſink.

This being premiſed, it will be eaſie to conclude from whence the ſaltneſs, and bitterneſs of the Sulphur-well proceeds. And as for the ſtinking odour thereof, that I ſuppoſe is cauſed from the vapours of the burning bitumen, and aduſt terreneſs mixt therewith, which lye not far from the very head of the Well.

Ob. If there be the ſame reaſon for the ſaltneſs of this Spring as there is of the Sea, then why is there not the ſame reaſon for the Sulphurious odour of the Sea as of this, and why doth not the Sea receive, and retain the ſame odour as this doth?

Sol. I do not deny, but the ſame odour may be communicated to the Sea, as to this water, together with the ſaltneſs thereof; but becauſe the ſaltneſs thereof was communicated to it by degrees, *viz.* from ſome certain

gulfs of the Sea, ſo alſo this odour; for it cannot be rationally conceived, that the whole Sea received all its Salt into it ſelf at one time after a natural way, and therefore being ſuch a great body muſt become ſaltiſh by little and little even inſenſibly. And accordingly the Sulphurious odour alſo is imparted to it inſenſibly, and although the ſaltneſs may continue by reaſon that the Salt it ſelf is of a fixed ſubſtance, yet the odour being of a ſubtile volatile nature, is exhaled by the Sun, and ſo loſt. But now the caſe is far otherwiſe in the water of this Sulphur-well, for this is at once fully impregnated with the ſaid ſaltneſs and Sulphurious odour, and immediatly paſſeth away through narrow channels, and veins of the earth, without any vaniſhing of the odour (by means of the Sun, or otherwiſe) which it contracted from the bituminous vapours.

Ob. What is the reaſon that ſeeing this water hath paſſed lately through the bituminous burnings, as it appears by its freſh odour of the ſame, ſhould be cold, and not hot, as hot Baths are?

Sol. 1. It was the opinion of *Fallopius*, that ſuch kind of waters proceed from a remote fire, but paſſing through narrow paſſages retain their full odour, and taſt, (which cannot be vaniſhed by the way any otherwiſe, than ſmoak through a Chimney, or pipe) although by the length of its paſſage, it may looſe its heat.

2. Though

2. Though the fire be near to the ſuperficies of the earth, where this water breaketh forth, yet it is very probable that the coldneſs thereof may proceed from a mixture of a cold ſpring before the breaking forth thereof. Neither let it ſeem ſtrange to any, that cold ſprings and hot may be ſo near together in the bowels of the earth: for juſt above the head of this Sulphur-well there ariſe two cold Springs, which meet and run down within a few feet of the head of the ſame. And Mr. *Jones* in his treatiſe of Buck-ſtones Bath in *Derbiſhire* ſaith, that the cold Springs and hot Springs are ſo near, that a man may put one finger in the cold, and another in the hot.

Having in ſome meaſure declared unto you the cauſe of this Sulphur-well, *viz.* of its ſaltneſs, bitterneſs, and ſulphurious odour, I ſhall in the next place give an account of ſome experiments, and obſervations which I made, and they are theſe, *viz.*

1. If Silver be put into this water, it is thereby tinged firſt yellow, and then black, but Gold is not all diſcoloured thereby.

2. If this water be a little boiled, it looſeth its tinging property, and alſo ſtinking odour.

3. It coagulates milk, if it be boiled therewith.

4. The diſtilled water thereof looſeth its odour, and doth not coagulate milk.

5. If the water be boiled, it will ſtill coagulate milk, though it looſeth its odour.

6. Seven gallons yield by evaporation a pound of Salt, which though at first black, I have made as white as snow.

7. This Salt coagulates milk also.

8. This water kills worms, and such kind of creatures presently, if they be put therein.

9. I filled two Vial glasses with this water in wet weather, and stopt the one, but the other I left open. The water in that which was stopt, within an hour, or two, became white, and thick, and within two, or three dayes deposited a white sediment, and the sides of that glass were furred, the water in the other glass altered not.

10. I filled two Vial glasses in fair weather, whereof the one I stopt, but the other left open, the water in neither of them turned colour any whit considerably, onely a kind of a thin whitish matter, after two, or three dayes fell to the bottom, the water continuing very clear. The water of that glass which was stopt, retained its odour most.

11. A pint of this water weighs two scruples, i.e. fourty grains more than a pint of common Spring-water.

Note that the reason of its tinging white metals is not from any bodily Sulphur, or bitumen mixt with it, (for the substance of them will not mix with water, but swim on it, as in the Spring at *Pitchford* in *Shropshire*, and in *Avernia*, in *France*, and in divers other places)

places) but from the vapours, or the ſubtile atomes & *effluvia's* thereof, which are mixed with the water, and in boiling are evaporated.

The reaſon of its coagulating property is from ſome occult acidity in the Salt thereof, which to ſenſe is not perceptible, onely by effect.

Out of the Salt is drawn a very good ſpirit of excellent vertue, as I ſhall declare in the next Chapter.

Before I conclude this Chapter, it will be worth taking notice, that about 240 yards above the head of this Sulphur-well is a bog, of about twenty yards diameter, in which I digged a mineral kind of ſubſtance, like the finders of Iron, but almoſt rotten, being corroded with ſome acid ſpirits, of which that bog is full, as alſo other places. This mineral ſubſtance being caſt into the fire burns blew, and ſmels like Sulphur; It is in taſt like Vitrial, and out of it Vitrial may be drawn, nay, in time it will be almoſt all reſolved into Vitrial. For I waſhed it, and ſet it in a Cellar for two, or three dayes, and it was covered over with a white ſweeetiſh Vitrial; which I diſſolved in water, and ſet the ſaid ſubſtance in a Cellar again, and it contracted the like, & I did as before ſtill reiterating this work till it was almoſt all turned to Vitrial. In the ſaid bog I found three or four ſorts of waters, *viz.* a Sulphur, and Vitrioline, and of each two ſorts. This was done

done the laſt day of my abode there, and therefore I had not time to make any further ſearch, onely ſome of that mineral ſubſtance I took with me, with which I tried the aforeſaid experiments. If any Gentleman would be pleaſed to expend ſome coſts in digging up this bog, and erecting ſome new Wels there, he would prove an acceptable benefactor to his Countrey, and it may be ſome new kind of water might be diſcovered hereby, having yet more vertues than any of the former.

Note that the ſtink of this Sulphur-well is perceived afar off, eſpecially in moiſt and cold weather.

CHAP. XV.

Of the vertues, and uſes of the Sulphur-well together with directions and cautions for the taking of it.

THe uſe of this water is either inward, or outward.

It being taken inwardly incideth, abſtergeth, attenuates and reſolves viſcous thick humours, and irritates every veſſel of the body to expel whatſoever humours are offenſive in them. It openeth, and removes thoſe ſtrong and obſtinate obſtructions, whether in men, or women, that would not yield to any other Me-

Medicine whatsoever. It doth oftentimes evacuate by stool great lumps of viscous slimy matter, which was certainly, whilest it was in the body, the cause of some great distemper, oppressure, gripings, tensions, &c. and which could hardly any other way be removed.

It heateth, and quickneth the stomack, bowels, liver, spleen, bloud, veins, nerves, and indeed the wholy body, in so much that it consumes crudities, rectifieth all cold distempers in all parts of the body, causeth a good digestion, cures the Dropsie, Spleen, Scurvy, Green sickness, Gout, Cramp, Epilepsie, headach, Vertigo, Kings-evil, and all such Symptomes as proceed either from crudities, cold, viscous, slimy, or corrupt humours, which obstruct & distemper the stomack, Bowels, Mesentery, Liver, Veins, Brain, and Nerves, and these though of long continuance. It killeth worms infallibly.

Note that this water must be begun by degrees, and the full proportion be taken not at once, but at several times, exercise intermediating, as in the taking of the Spaw.

The full dose, or quantity to be taken must be proportioned according to the constitution & strength of the party & his bearing of it, as also the humour offending, the predominancy of the distemper, and the aptness of the body to be wrought upon. In cold, dull bodies more may be taken than otherwise may. In general, let the proportion to be taken, be

ſuch, as may cauſe four, ſix, or ſeven ſtools, without any manifeſt inconveniency of the fewneſs, or multiplicity thereof.

Note that in many bodies this water works very quickly, and indeed too ſoon, and in ſuch a caſe my adviſe is, that two, or three glaſſes of the Spaw-water be firſt drunk, for that will ſomewhat impede the ſudden operations thereof, & cauſe it to continue longer in the body, for the better performing of its operation therein before it paſs through it.

Note alſo that after the full proportion is taken, and in a good meaſure paſſed through the body, four, or ſix glaſſes of the Spaw-water may be drunk for the prevention of the excoriation of the bowels and fundament, eſpecially in hot cholerick bodies.

They that cannot drink this water by reaſon of its ſtinking odour, and yet ſtand in great need of the effects thereof, may boil it a little while, till it hath loſt its odour, and then drink of it, for although ſome vertue vaniſheth with the odour thereof, yet the greateſt and moſt effectual vertues which are in the Salt, and aforeſaid ſubtile acidity thereof do yet continue as I have often tried, or if they pleaſe, put ſome Salt thereof into the Spaw-water, and ſo drink it, for indeed as I ſaid before, the chiefeſt vertue lies in the Salt.

The Salt alſo thereof being rightly made, & put into any common Spring-water, doth in good meaſure perform the ſame effects.

The

The ſpirit of this ſalt is of excellent vertue, if a drop, or two thereof be put into every glaſs of the Spaw-water, for it makes it far more penetrative, and indeed far more effectual againſt all diſtempers, and diſeaſes, as the Dropſie, Gravel, Stone, and ſuppreſſion of Urine, *&c.*

I adviſe, that they that have any inflammation, or excoriation in their bowels, abſtain altogether from the taking of this water, becauſe it will inflame them more; alſo they that have Ulcers, and inflammations in their kidnies, and bladder, and are troubled with a ſharpneſs of Urine.

Such directions for exerciſe, and diet, as I have preſcribed for the Spaw drinkers, I preſcribe alſo to Sulphur-water-drinkers for the general; onely this liberty I grant them, *viz.* that theſe may exerciſe leſs, and feed a little more liberally than Spaw-drinkers.

This water uſed outwardly diſſolves hard tumours, cures old Ulcers, the Scab, the Itch, the Scurff, Leproſie, and all ſuch breakings out whatſoever, if the parts ill affected be waſhed, and bathed therewith, for it dries, conſumes all corrupt humours in the habit of the body, and prevents all putrefaction of humours in the ſame.

It being uſed by way of a warm Bath for the whole body, is of the ſame efficacy, as *Paracelſus* ſaith, that his *liquamen ſalis*, i. e. brine is of, and that is to conſume all humid diſtempers, whether hot, or cold, as the Drop-

ſy, Gout, hard tumours, ſwellings of the legs Leproſy, and the like, alſo it makes the fa lean, and reduceth them into a natural dry, firm, healthy habit of body. but it muſt cautiouſly be done with the obſerving of ſuch rules and directions, as I preſcribed for bathing in warm water, as in Chapter the 4.

I wiſh there were more conveniencies, as fit veſſels for bathing, at this Well, than are, for I believe that after a time, Baths with this water would grow more in uſe, and become as famous as thoſe hot Baths in *Sommerſetſhire* for many uſes.

The ſpirit of the Salt rubbed into any parts ſwelled, or pained onely, cures them preſently.

And as the waters themſelves are outwardly uſed for cleanſing, and healing, ſo alſo there is a kind of ſlimy bituminous mud below the Sulphur-well, which will burn like Sulphur, and is of great efficacy for mollifying, digeſting, and reſolving hard tumours, and for corroborating weak infirm parts, and allaying of pains, and aches in the limbs, of what nature ſo ever, being outwardly applied.

As I am ſilent in particularizing cures, yet one ſtrange cure I cannot but mention, *viz.* A certain youth came the laſt year to theſe waters from the more remote Northern parts, having on each finger a horn, covering the top thereof, and alſo a horny ſubſtance on his wreſts, and face, which with the inward, and outward uſe of this Sulphur-water did

in a little time, being looſed thereby all fall off. If ſuch excreſcenices may be looſened and made to fall off thereby, then *Attendite Cornigeri! En vobis medelam!*

Chap. XVI.

Of the Dropping, or Petrifying-well.

Over againſt the Caſtle of *Knareſborow*, the River *Nide* running betwixt, ariſeth a certain Spring, in the manner of other Springs in a high ground, which running a little way in an entire ſtream, is at the brow of a deſcent by a dam of ragged ſtones, divided into ſeveral trickling branches, whereof ſome drop, and ſome ſtream down, partly over, and partly through a jetting Rock, and this Spring is of a petrifying nature, for of it was the Rock, from which it diſtils, wholly made, and is by it daily increaſed, notwithſtanding the cutting off great pieces from it. This water alſo generates ſtones where it fals, and likewiſe where it runs, but not all the way it runs, but near the place onely where it fell, the reaſon of which I ſhall preſently ſhew.

If any ſtick, or piece of wood lye in it ſome weeks, it will be candied over with a ſtony whitiſh cruſt, the inward part of the wood continuing of the ſame nature as before. But any ſoft ſpongie ſubſtance, as moſs, leaves of trees, &c. into the which the water can enter,

will thereby in time become ſeemingly to be of a perfect ſtony nature, and hardneſs.

Now the cauſe of this petrifying property is, as Philoſophers call it, *ſuccus lapideſcens*, i. e. a ſtony matter which is in its *principiis ſolutis*, for indeed the *principia ſoluta* of all things, whether animals, vegetables, metals, or minerals are in a liquid form, and are concreted by degrees, by a natural heat ſeparating from them all accidental humidities, and fixing them into their proper ſpecies.

When the water, with which this *ſuccus lapideſcens* is mixed, is in part waſted by the Sun and air, it doth then depoſite it, as being too heavy for it any longer to bear it. And when that is depoſited, or fallen down, it doth by a continued addition, and concretion in time amount to a conſiderable ſtony maſs.

For the better underſtanding the true nature, and cauſes of this water, I made theſe three experiments.

1. I evaporated away the water, and in the bottom was left a ſtony pouder, very like to the pouder of the ſtones of the Rock.

2. A pint of it weighs ten grains heavier than a pint of common Spring water.

3. It coagulates milk if it be boiled therewith, and the reaſon of this is, becauſe for the *principiis ſolutis* of all minerals, nature hath provided ſome Sulphurious acidity for the better fermentation, and digeſting them into perfection. The chief vertues of this water are to allay acid, gnawing, and hot cholerick humours,

mours, and to ſtop all fluxes proceeding from thence; It is alſo good againſt burſtneſs, piſſing of bloud, all overflowings in women, and ſtrengthens the back.

They that take this water, except in caſe of looſeneſs, muſt every other day take a glyſter, or ſome lenitive as Caſſia, Manna, &c. every other night, in caſe it binds too much.

This water in many caſes is better than the ſyrup of Coral, and the pouder of the Rock, or rather the pouder that remains upon evaporation maybe uſed for Coral; for the truth is, (as is the opinion of many Philoſophers) that Coral is a certain vegetable, fed and nouriſhed with a *ſuccus lapideſcens*.

The proportion of the water to be taken is from half a pint to half a gallon, according to the age, conſtitution, diſtemper, and place of the diſtemper.

The quantity of the pouder is from ten grains to a dram, according to the aforeſaid conſiderations.

CHAP. XVII.

Of S^t. Mugnus *Well.*

WHether *Magnus*, or *Mugnus* be the true, and Original name of this Well I could never yet be aſcertained; It is uſually called by the latter. Now whether this Well was Sainted from its real vertues, or

only

onely ſuppoſed vertues attributed to it, becauſe firſt Sainted, I will not ſtand now to diſpute, but I rather believe the former. Dr. *Dean*, will not have any greater vertues attributed to it, than to common Springs, allowing it onely a bare name, and title. It ſeems the Dr. was no Catholick, or if he were St. *Mugnus*, muſt not be his Interceſſour.

Now the reaſon why he will aſcribe no other than common vertues to this water, is becauſe, as he ſaith, it hath no mineral vertues, and faculties, I ſuppoſe he means perceptible. But to this, anſwer might eaſily be made, *viz.* that waters oftentimes are impregnated with mineral vertues, and ſpirits to, although inſenſibly. Who would have thought that the dropping-well would have yielded a ſtony pouder upon evaporation, and coagulate milk? Beſides if upon experiment nothing could be found perceptible to ſenſe in waters, muſt we alwayes judge of things by ſenſe, and not ſometimes by effects?

In many mineral waters the ſubſtance of minerales, and metals is mixed, in other ſome the groſs, perceptible vapours onely, and in other ſome, the ſubtile inſenſible ſpirits, or rather atomes, and effluvia's. In this well the laſt onely, and they are the effluvia's of either Lead, or Tin mines (as is the opinion of ſome Philoſophers, concerning ſuch kind of Springs) which being mixed with the water, do not onely give activity to its coldneſs (as do cold atomes of the Northen wind to rain con-

congealing it into ſnow; which will with much handling, heat the hands, and make them even to burn) but alſo a kind of fermenting nature to it, ſo that when the water hath a little entered into the pores of the body, it cauſeth a kind of light fermentation amongſt the humours, and by conſequence ſtirs up a heat in the habit of the body, and withall draws out the natural heat into the ſame. And this is apparent, for if any one enter into this water to Bathe, or waſh himſelf, and abide there but a quarter of an hour, or little more, he will as ſoon as he comes forth, preſently become very hot (his body being all over red) and ſo continue a long time, although he walk in the cold air; nay, although he put not on his clothes.

Nay, many times tender women, who dare ſcarce waſh their hands in cold water, will adventure to go into it, although it be colder than ordinary water, with their linnen about them, and when they be come forth, go to the next houſes, and lye in their wet linnen all night, and towards morning begin to ſweat, and by this means are cured of many old aches, in what part of the body ſoever they are, and of ſwellings, and hard tumours, and agues, and indeed many outward diſtempers and ſymptomes cauſed either by cold, or hot humours, the latter being cured by an actual coldneſs, *viz.* if it be a bare diſtemper of heat only, for which alone ſometimes will be ſufficient; the former by the heat of

the body, being drawn outward & increased, whereby humours offending are digested, attenuated, & discussed, or evaporated by sweat. Also such distempers as are caused by too much chilness, and tenderness, are hereby recovered. And upon this account it is, that they that are very tender in their heads, and wear many caps, and subject to take cold upon every slight occasion, are cured of this tenderness by washing their heads, two or three times in a day in cold water: for hereby the open pores, which let in the cold, & through which the natural heat did too much transpire, are closed, and stopt.

Before any attempt the use of this cold Bath, let them first consult with some able Physitian; and if they please, observe such directions for the ordering of themselves, as I have given in the fourth Chapter, concerning bathing in cold water.

This Well is square, with a high wall about it, and a howse adjoyning to it, where people make themselves ready for bathing, going immediatly out of it into the Bath.

This Spring riseth high about *May*, and fals low about *September*.

Now if any shall not approve of my *hypothesis*, concerning the nature of this Well, let them tell me of one that is more rational, and I shall not be ashamed to learn that, which I am convinced I did not know, or else let them embrace mine. The reason inducing me to declare this of mine is, because

I know it is the unanimous conſent of moſt ſound Philoſophers, that waters running through Tin, Lead, and Silver mines, or minerals of a cold nature, may contract ſome imperceptible medicinal vertues from them, (and therefore *H. ab Heers*, and *Helmont* ſay, that many Medicinal Springs are called *fontes acidi*, from their effects, not ſenſible acid mineral taſt) and alſo becauſe I know that this Countrey yields almoſt all manner of metals and minerals, which an expert Artiſt, aſſiſted with a good purſe, would eaſily diſcover. I believe that many other Springs of this nature might in that Countrey, and other ſuch mineral Countries be found out upon examination, and triall.

Now for the concluſion of all, let not any one judge me to be a Catholick by this my approbation of this Sainted Well, for I am none, and as none my ſelf, ſo neither do I hate thoſe that are, or thoſe of any other heterodox judgement whatſoever. Their living according to their own light, and within the bounds of civility, is a ſufficient ground, for me to exerciſe good will, and love to them.

And as I do not out of any ſuperſtitious account attribute any medicinal vertues to this Sainted Well, ſo neither do I do it out of any affectedneſs to contradict D. *Deane's* judgement.

The reaſon of my vindication of it, is

grounded upon some notable cures, which I have seen effected thereby. And the Doctor himself acknowledgeth, that it hath formerly been very much frequented by all sorts of infirm people: if so, then certainly not without some cause.

Now if it were but their faith in the water, and strong imagination, (as some may say) that cured them, yet let them use this water, or any lawfull means else that may exale their imagination, if that may promote their cures.

FINIS.

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